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# FARM WORKSHOP *Guide*



EDITED BY  
R. D. COLQUETTE

PUBLISHED BY THE  
EXTENSION DEPARTMENT

*The Country*  
**GUIDE**

WINNIPEG

MANITOBA

**148 PAGES**

OF PRACTICAL "F-W" IDEAS  
FOR THE FARM AND HOME  
ARRANGED IN CONVENIENT SECTIONS



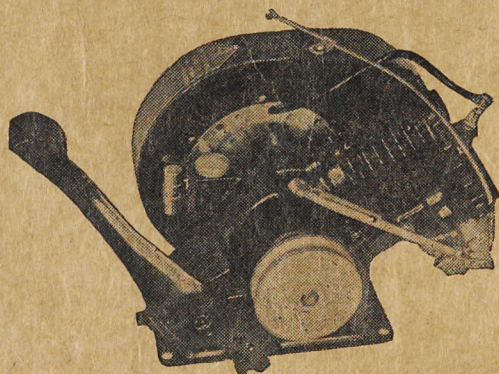
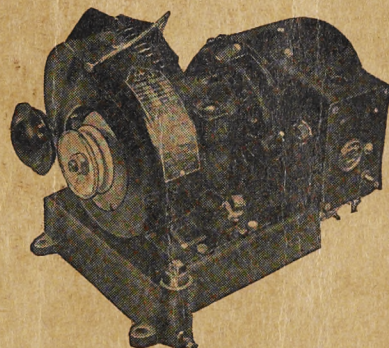


# COMFORT • CONVENIENCE • SAFETY • *with a* JOHNSON CHORE-HORSE



## *Johnson* CHORE-HORSE GENERATORS

■ Supply Low Cost electric light for house, barns and yards. The Johnson Chore-Horse, a gasoline fueled electric generator, provides brilliant, safe electric light. It does away with old fashioned, dangerous oil lamps and lanterns and makes evening chores a pleasure. Simple to install, low in cost and economical to operate, the Chore-Horse will soon pay for itself in time and labour saved. It will also provide power for running a radio and charging batteries.

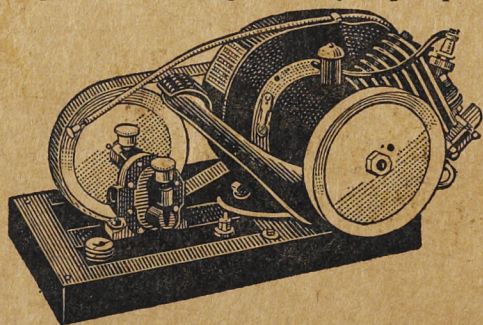


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■ The simple, inexpensive Johnson Water Pump solves the problem of running water for house, barn and pasture. No longer need you pump and carry water . . . attach this simple unit to your Iron-Horse engine (as shown) and hours of time and strenuous labour will be saved.



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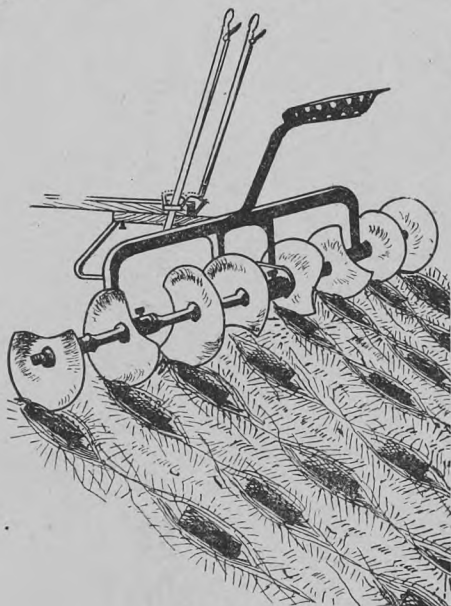


## SECTION 1.

# Field Implements and Heavy Equipment

## Disc Troughing Machine

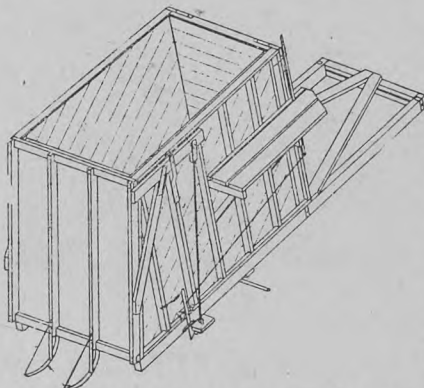
Soil erosion is becoming more serious in some districts. A disc troughing machine, which scoops out pockets or troughs in the soil, was constructed at the Dominion Experimental Station, Swift Current in 1934. The pockets or troughs in the soil hold run-off water from melting snow in the spring or from heavy rains, thus helping to conserve water and reducing damage by erosion. This is suitable for either bare fallow or stubble or weedy land. An old disc harrow, preferably with 18-inch discs, is used. Every other disc is removed and about one-quarter of the perimeter of the remaining discs is cut out with an acetylene torch. The cut-away-discs are arranged on the square axle so that the cut away portions follow each other in succession. In this way only 3 or 4 discs are in contact with the soil as the machine moves over the ground. The machine, therefore, is prevented from bumping over the ground, and the troughs in the soil are uniformly and properly spaced. As the troughs are small and not deep, the tractors move over the trough soil more easily than where the holes are made fairly large and deep with some types of damming machines. The disc trougher can be used separately or hitched behind another implement so as to leave the land protected against possible erosion. The disc trougher is also useful in areas where the trash cover must be preserved as much as possible to prevent wind erosion, since the stubble is not as greatly disturbed as by some other types of damming machines. The original levers are left on the machine to vary the depth of the troughs in the same manner as when the machine was originally used as a disc harrow.



## Header Barge

This header barge was designed at the Dominion Experimental Station at Swift Current in 1933, and has been built and operated successfully by many farmers since that time.

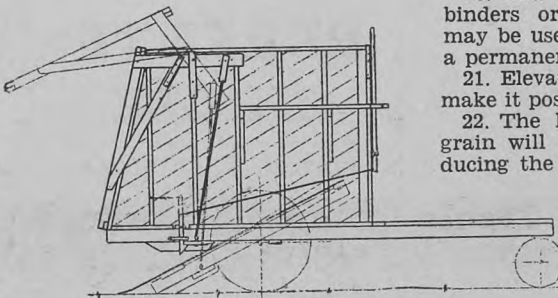
The special feature of this header barge is the automatic discharge of the stack. With one movement of a lever, the dump bottom is tilted by the weight of the stack. At the same time the rear gate is lifted and the stack slides out.



As soon as the stack is discharged, the rear gate falls back to its former place and lifts the dump bottom back to its normal loading position. Thus every movement becomes automatic after the first and only manual operation of the trip lever.

### Suggestions to Barge Builders

1. The successful barge must be simple in design—a minimum of working parts.
2. The type of barge should be such that it will prevent any loss of time when cutting.
3. The barge must be inexpensive to construct.
4. The size of the barge box must be made to suit threshing methods.
5. The size of wheels and power available to pull the barge will influence the size of the stack or box.
6. The stacks should be as high as possible. Width not over seven feet and as long as it is convenient to build the box.
7. Floor and sides of the box should



be lined with smooth lumber or tin to make dumping easier.

8. The tilting floor, pivoted on the main wheel axle is the most satisfactory type of floor construction.

9. The solid frame and sides with tilting floor is cheapest to construct.

10. The rear gate hinged on the top and opened by the floor makes an automatic, time saving barge for cutting without stopping when discharging the stack.

11. Pieces of old machinery or granaries, etc., should be used wherever possible in constructing the barge to cut down costs.

12. Old tractor, swather, header or other large wheels are the most suitable for use on the rear of the barge.

13. Any low wagon, truck or implement forecarriage wheels are suitable for front barge wheels.

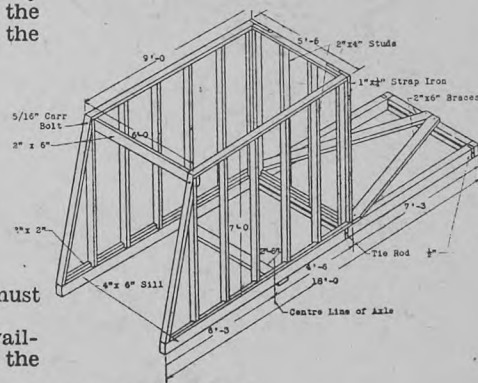
14. The larger the rear wheels, the lighter the draft of the barge.

15. The wider the face of the barge wheels, the lighter will be the draft.

16. The higher the rear wheels, the greater will be the slope of the floor and the more positive the discharge of the stack.

17. The barge box should be wider at the rear than at the front—usually 6 inches wider at the back.

18. The type of cutting device should be decided upon or secured before starting to build the barge.



REAR AND SIDE VIEW OF BARGE FRAME

19. Elevators mounted on the barge and run from the rear wheels of the barge are the most satisfactory type of loading devices.

20. End delivery swathers, headers, binders or detachable combine table may be used with the barge which has a permanent elevator.

21. Elevators attached to the barge make it possible to build a higher stack.

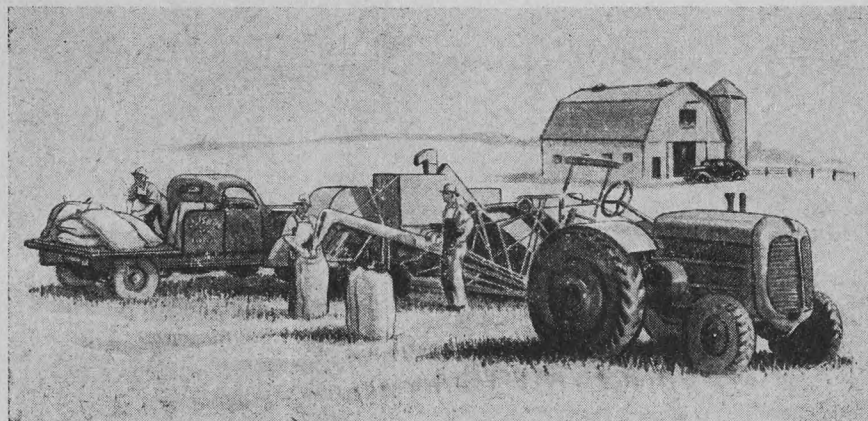
22. The higher the stack, the more grain will be under one top—thus reducing the chances of spoilage.

23. Elevators mounted on the cutting device and high enough to deliver into the barge box are frequently used.

24. Delivery of the cut



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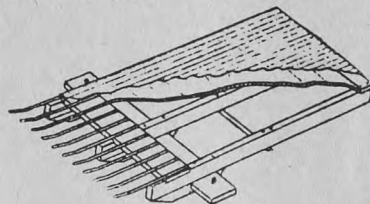


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TORONTO CANADA

grain over the front of the box has been found to be the most satisfactory with the best "keeping" stacks as a result.

## Suggested Bill of Material

The list of materials used in constructing this barge is suggested in order to guide the builder in gathering enough suitable material. The kind,



sizes and quality of material used by the farmer for his own barge will undoubtedly be determined by his own pocketbook and the amount of scrap material from old buildings, old discarded machines and other places which are usually found in every district.

## Lumber Required

9 pcs. 2-in. x 4-in. 8 ft. long  
3 pcs. 2-in. x 4-in. 12 ft. long  
9 pcs. 2-in. x 4-in. 14 ft. long  
2 pcs. 2-in. x 4-in. 16 ft. long  
2 pcs. 2-in. x 6-in. 14 ft. long  
1 pc. 2-in. x 6-in. 10 ft. long  
1 pc. 2-in. x 8-in. 12 ft. long  
1 pc. 3-in. x 6-in. 10 ft. long  
1 pc. 3-in. x 6-in. 18 ft. long  
2 pcs. 4-in. x 6-in. 18 ft. long  
1 pc. 4-in. x 6-in. 10 ft. long  
280 board feet Shiplap—14 foot lengths.

Oak or Fir  
(Platform)

## Other Material Required

### Frame:

Flat iron for reinforcing corners.  
Two tie rods— $\frac{1}{2}$ -inch round iron, 5 ft. 7-in. and 5 ft. 3 in. long.

### Running Gear:

Two rear wheels about 48 ins. in diam. and a 9-in. face.  
Steel axle to suit wheels, about 2 ins. in diam.  
Two front wheels, small trucks off some farm implement suggested.  
2  $\frac{3}{8}$ -in. U-bolts 2 ins. x 12 ins.

### Gate:

Two brackets, four pieces 3 ins. x  $\frac{1}{4}$  ins. x 2 ft. 4 ins. flat iron.  
Four pieces flat iron, 2 ins. x  $\frac{1}{8}$  ins. x 1 ft. 4 ins.  
Two pieces flat iron 1  $\frac{1}{2}$  ins. x  $\frac{1}{8}$  in. x 3 ft. 8 ins.  
Two pieces flat iron 1  $\frac{1}{2}$  ins. by  $\frac{1}{8}$  in. x 1 ft. 4 ins.  
Two pieces round iron,  $\frac{3}{8}$ -in. diam. 2 ft. long.  
Two 10-in. clevises—2 pieces, 1  $\frac{1}{4}$ -in. x  $\frac{1}{4}$ -inch x 2 ft.  
Two  $\frac{1}{2}$ -in. rods, 6 ft. long.

### Dumping Floor:

Eleven teeth—11 pieces 1 in. x  $\frac{1}{4}$ -inch x 2 ft. 11-ins. flat iron.  
Three pieces—3-in. x  $\frac{1}{4}$ -in. x 5 ft. flat iron for skids.  
Two pieces angle iron for trip catches.  
3  $\frac{1}{2}$ -in. U-bolts, 2  $\frac{1}{2}$ -ins. x 10-ins.  
Two  $\frac{5}{8}$ -in. eye bolts.  
One piece of pipe about 5 ft. to fit over axle.  
Two sheets of corrugated galvanized iron, each 2 ft. 6 ins. x 9 ft. 0 in.  
Sheet iron may be used by making minor changes in the floor construction.

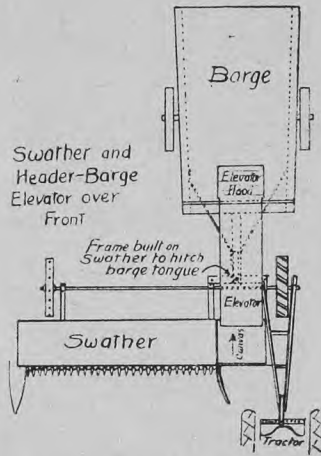
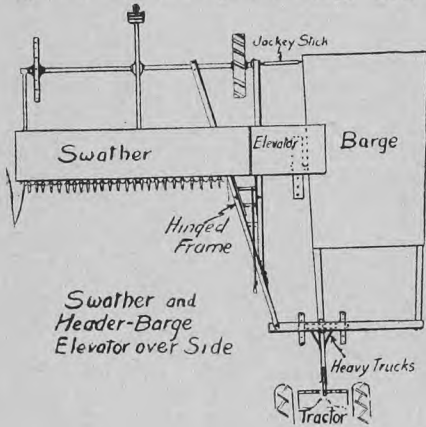
### Tripping Device:

One lever—5 ft. long.  
Two arms—7-ins. long.  
One shaft— $\frac{3}{4}$ -in. round iron 6 ft. long.  
Two trip-hooks—two pieces flat iron—2 ins. x 1-inch x 2 ft. 0 in.  
Two rods or cables— $\frac{1}{4}$ -in. diam.



## Header for the Barge

While push-headers and binders with elevating equipment can be hitched to a barge, the most suitable heading machine for the barge is the swather with an end delivery. The design of swathing machines varies. Some swathers deliver cut grain over the end of the table clear of the ground wheels. Others deliver the grain on the ground on the inner side of the ground wheels. The extra end delivery type is more readily equipped with an elevator to deliver the grain over the side of the barge. See Fig. (1). Since only the barge floor

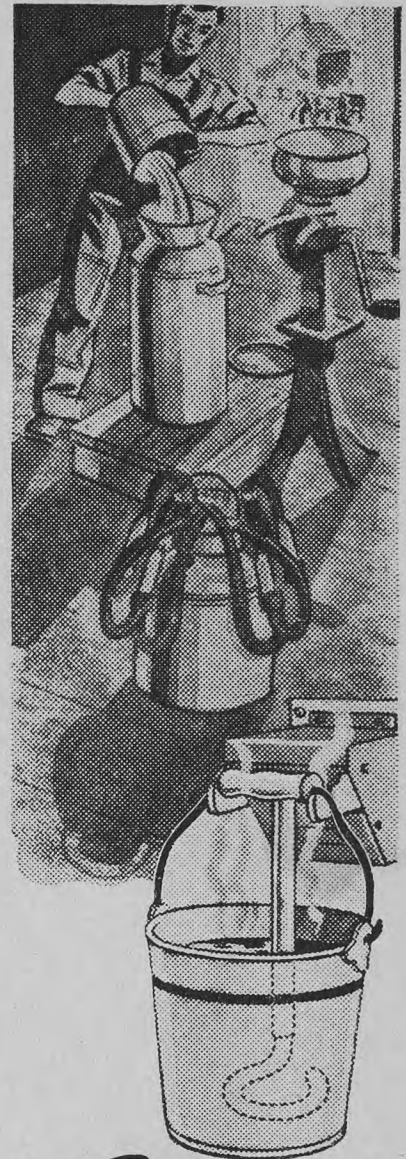
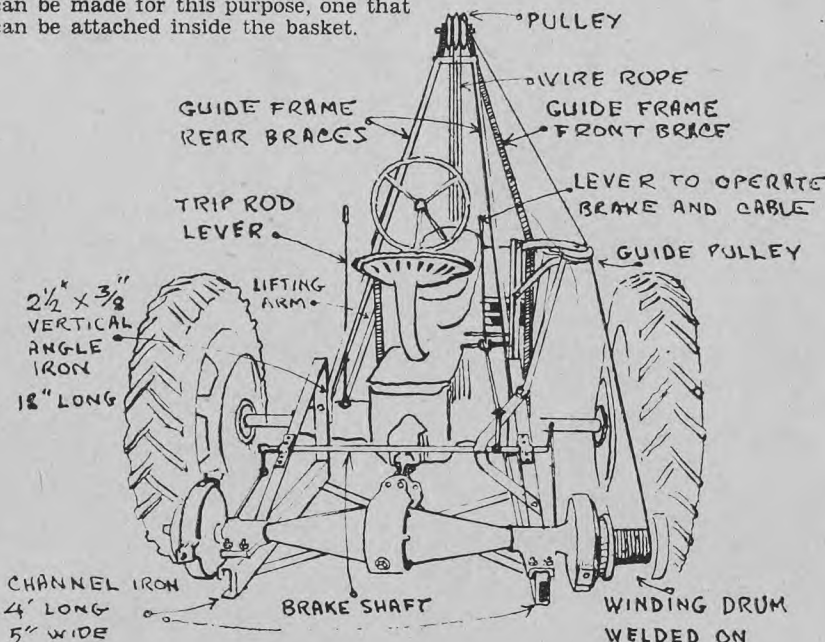


dumps and as the sides do not tilt, the dump floor type of barge is quite suitable for the side delivery elevator. Swathes which deliver grain on to the ground on the inner side of the drive or bull wheel are easily equipped with an elevator to carry the grain over the front of the barge. See Fig. (2). Dimensions are not shown in the sketches. It is expected that the builder will use his own ingenuity in adapting such cutting machines as he can obtain to be used as a header attachment for the barge.

## Power Manure Loader

When gathering material to build a power manure loader pick strong material for the basket and lifting arms. A basket of wet manure weighs roughly 900 pounds and three such baskets fill the box of most manure spreaders. The manure basket can be removed and a blade put in its place and then used as a bull-dozer. If the machine is to be used for loading gravel a solid bucket can be made for this purpose, one that can be attached inside the basket.

The frame for the power hoist is attached to the back of the tractor in place of a draw bar. A row tractor type is preferred. If a Farmall is used that is equipped with wide draw bar, remove the draw bar bolted to the casting on the gear drive housing and put in place of a draw bar, a heavy piece of 6-inch channel iron. This has to carry the weight of the power drive unit.



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The other type of Farmall with low axle will have special quick detachable brackets cast on the axle housing. In this case use two heavy 18-inch lengths of  $2\frac{1}{2} \times \frac{3}{8}$  angle iron. Bolt these in a vertical position to the quick detachable brackets. Two pieces of channel iron 4 feet long and 5 inches wide can be used to carry the power drive unit. The front end of these is welded to the upright angle iron bolted to the quick detachable

moved from the right hand side and a piece of three-inch pipe eight inches long is welded on for the lifting cable to wind on. Boxings for the brake shaft are welded on to the angle braces on the frame for the power drive. At each end of this shaft, a brake arm is attached one turned up and the other

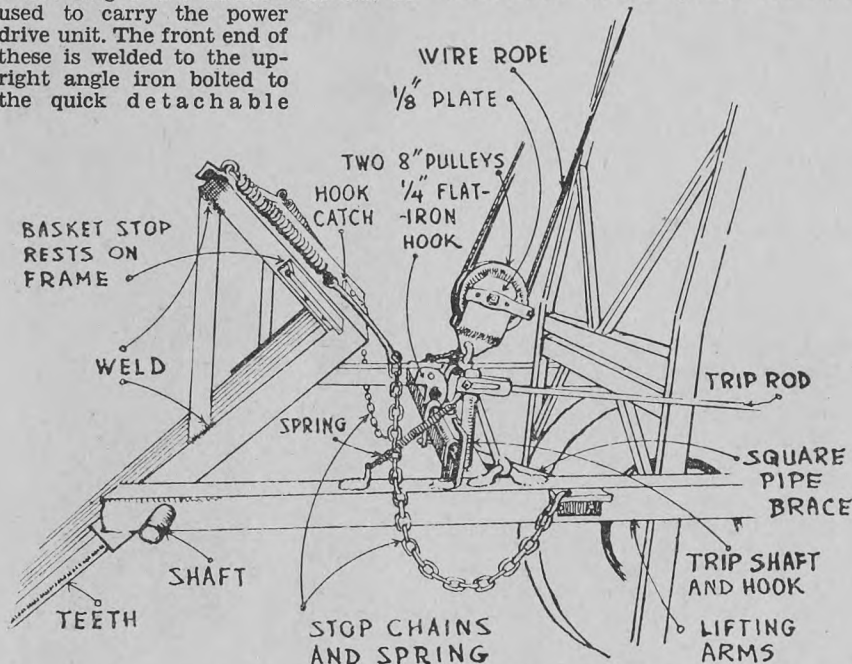
gether from end to end. These arms are about 11 feet long, depending on the length of the tractor. They are hinged on to the heavy piece of upright angle, a part of the frame for the power unit. They should be hinged at a point about 22 inches from the ground, and extend past the front tires of the tractor approximately 32 inches.

These arms may have to be spread out or have a slight bend in them to accommodate the basket, as it is four feet in width, because at the point where they are hinged under the tractor axle, they may not be four feet apart. The arms have, therefore, a slight bend to spread them enough for the basket to swing free in.

If these arms are made from old "I" beams off the frame of old seed drills they will have to have pieces of flat iron welded between the web on each side to give them the necessary strength. With these arms extending 32 inches past the front tires of the tractor, measure back on the arms from the  $1\frac{1}{4}$ -inch hole that is for the dump basket shaft, about 21 inches. At this point have a piece of railroad iron or a heavy piece of "I" beam welded in between the arms. This must be strong as it lifts the whole load. There should be nine or ten inches of clearance between this cross bar and the front tires when the dump basket is resting on the ground.

To stiffen these arms there should be short pieces of square pipe welded from the cross bar angling over to the arm. With these pieces welded in it stops side swing when the load is lifting. Length of square pipe about 16 inches.

The frame of the dump basket is made from heavy angle iron  $3 \times 3\frac{1}{2}$ -inch, the fingers of the basket are made from  $1\frac{1}{4}$ -inch pipe with old inch and a quarter seeder axles welded inside the pipe. The shafting extends through the pipe three inches then heated pounded out to a nice sharp point. Fingers are 4 feet 6 inches, spaced 6 inches apart. On the bottom of the basket, 18 inches from the back, weld on a piece of channel iron with clips welded into the corners



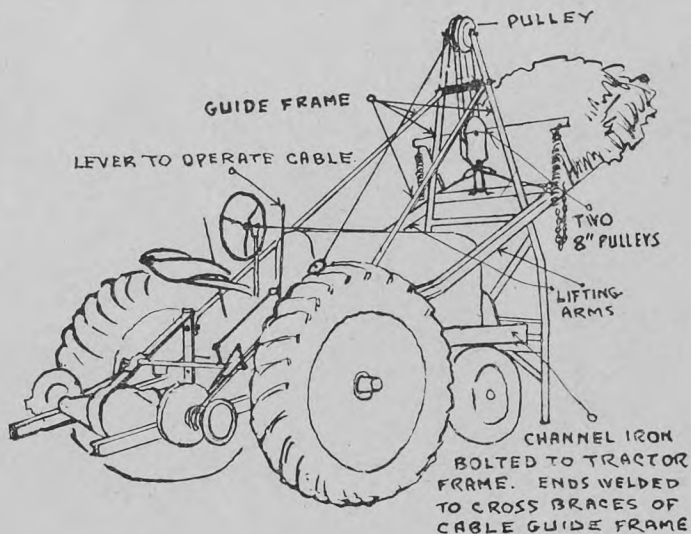
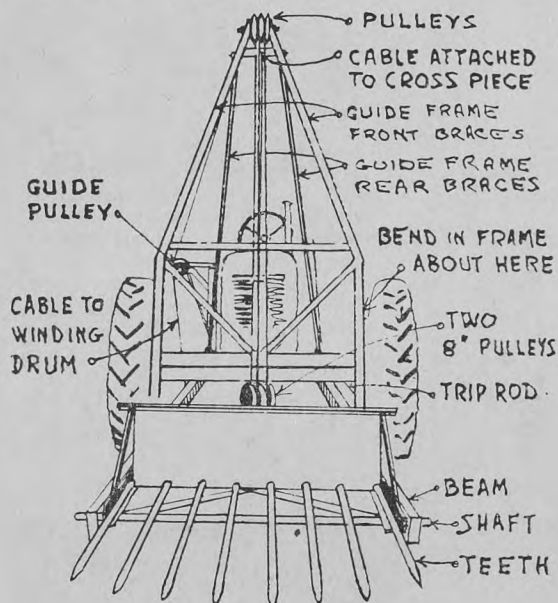
brackets. To give rigidity, angle iron braces are welded to the top of the vertical pieces and to a point one foot from the end of the pieces of channel 5-inch iron.

For the power drive unit a heavy second hand car rear end is used. Essex or Nash are satisfactory since they have a low gear ratio. It is also necessary that this rear end should have external brakes. The brake drum is re-

down. The brake lever is attached to this shaft and held in a neutral position by a spring from the forward side.

A short piece of shaft is necessary and a universal joint from the drive of a power binder or any other that is suitable as long as it is the right size to slip on to the power take-off spline shaft of the tractor.

The lifting arms can be made from  $2\frac{1}{2} \times \frac{3}{8}$  angle iron, two pieces welded to-





of the channel they act as bearings for the shaft that the basket swings on. Overall width of basket is 4 feet.

The cable and guide frame that bolts on the front of the tractor is made from 2-inch angle iron 9 feet long braced with  $1\frac{1}{4} \times \frac{1}{4}$ -inch angles. To fasten this frame to the tractor it may be necessary to put a heavy piece of channel on each side of the tractor frame letting them extend about four inches out past the tractor radiator, these pieces of channel can be welded to the two heavy cross pieces of angle iron in the cable guide frame.

To give the basket clearance when it is lifted high enough to dump into a manure spreader the upright side angles of the cable guide frame have to be bent back one foot, starting to bend them above the heavy pieces of angle that fasten to the tractor. In the top of this frame there are two eight-inch wire rope pulleys, set in on an angle so as to keep the cable going straight to the winding drum. From each side of this frame at the top runs a brace down to the axle housing of the tractor. These braces are made of one-inch pipe.

Stop chains with a spring are necessary on each side of the basket to stop it from going too far around when dumped or damaging the tractor radiator. The springs bring the basket back, locking it in place ready for filling again.

Above the heavy cross piece that is welded between the lifting arms there is another pair of 8-inch wire rope pulleys, these pulleys are in a frame made of one-eighth plate. The plates are riveted together on the lower side of the pulleys, with a  $\frac{3}{4}$ -inch hole drilled through the plates to take a  $\frac{3}{4}$ -inch ring. This ring connects with an eye on the top of the beam. A brace is necessary from each side of the pulley housing down to the lifting arms to stop side sway.

About 50 feet of  $\frac{3}{8}$ -inch wire rope is required. There also has to be a guide pulley above the rear axle of the tractor to guide the cable onto the winding drum.

Also on the above mentioned cross bar there is an inch trip shaft held in place by small brackets welded on the top of the cross bar. The outer end of the trip shaft is bent up 8 inches and flattened a little. Some holes are drilled to accommodate the trip rod that is on a level by the tractor seat. On the inner end of the trip shaft is a hook made of  $\frac{3}{4}$ -inch flat iron, this hook catches on a plate on the back of the dump basket.

When operating this machine there are only two levers to work, one to trip the basket, the other to raise or lower the basket. The power take-off from the tractor runs all the time. The lever is held ahead by a spring, and when in this position the one axle and brake drum are turning free through the differential. When the lever is pulled back the operation is reversed, the free drum and the axle with the winding drum start to wind the cable and raise the load.



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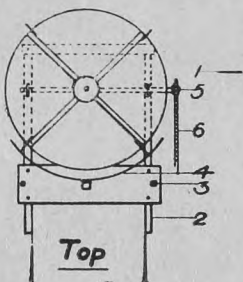
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## Grasshopper Bait Spreaders

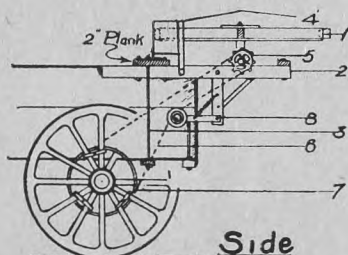
### Combine Straw-spreader Type

This equipment may be adapted for use with either a wagon or a truck. The straw-spreader assembly from a combine harvester-thresher together with a wood or metal frame and an automobile tire rim or a pulley are the principal parts required. The spreader is mounted on a frame on top of the wagon or truck. It is quickly attached



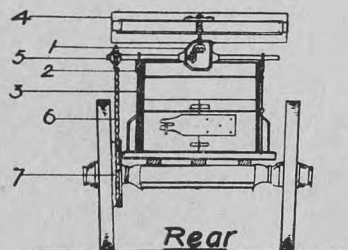
or detached by means of a half-inch round iron tie-rod on each side of the box connected to a 2-by-4 cleat below the box. This arrangement also permits the chain or belt to be sufficiently tightened by sliding the spreader back before it is clamped into operating position.

No automatic feed hopper is provided, although one similar to others described for other types of spreaders



may be added if required. When no feed hopper is used, the bait is thrown on to the revolving table by hand in small amounts at regular intervals. To scatter the bait in the desired direction the operator applies the bait to the right, rear or left of the revolving table as is determined by trial. Parts numbered in figures are as follows:

1. Straw-spreader from combine harvester-thresher, including fan blades and mitre gears. Rubber belting attached to tip of the blades.

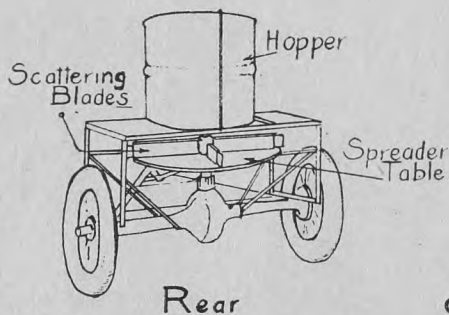
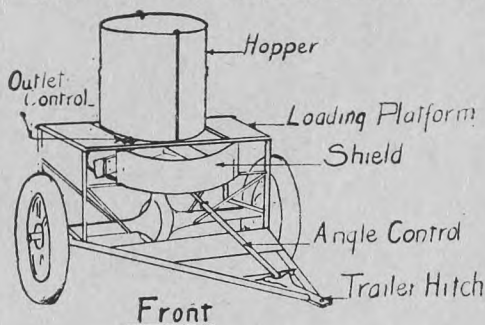


2. Wood frame constructed of 2- by 4-inch lumber and a piece of 2-inch plank.

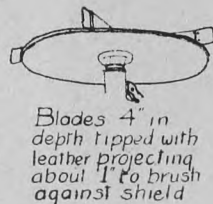
3. Tie-rods,  $\frac{1}{2}$ -inch round iron.
4. Sheet metal shield attached to wood frame with 2- by  $\frac{1}{4}$ -inch iron strap.
5. Sprocket gear, about nine to eleven teeth for size 52 chain or similar.
6. Sprocket chain, link size about 52.
7. Automobile tire rim fastened to wagon wheel with four clamps. The tire rim is lagged with a piece of rubber belting to prevent the chain slipping.
8. Chain tightener attached to 2- by  $\frac{1}{4}$ -inch flat iron arm pivoted to the wood frame. A spring supplies the necessary tension. When this chain tightener is slack, wagon can be moved without operating the spreader.

### Trailer Type

An automobile rear axle and gear assembly, including the propeller shaft and housing and the rear wheels, provide the essential parts for constructing a spreading machine. Such a machine can be used for broadcasting grass seed,

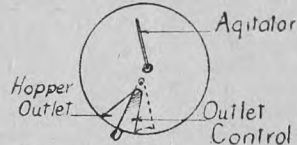
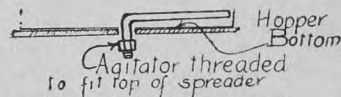


Spreader Table  
diameter 3 feet  
Supported by frame  
and fits around drive  
shaft. Blades fastened  
to table. Blade head  
screwed to drive shaft.  
Drive shaft shortened to  
place spreader table  
16 inches above axis

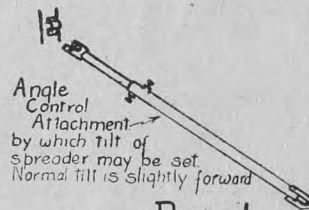


machine. The hopper is made from an old oil drum. An agitator feed bar is fastened to the end of the propeller shaft inside the drum. An outlet in the bottom of the hopper, with a feed gate, controls the amount of bait or other materials which is to be spread.

Details of various parts are shown in the sketch. Further details of construction of this and other types of baits may be obtained from the Dominion Experimental Station, Swift Current, Sask.



Top view of hopper  
bottom showing position  
of agitator, hopper outlet  
and outlet control



### Detail

### Bait, Seed or Fertilizer Spreader Cone Hopper Type for Wagon or Truck

The cone-hopper wagon or truck type of spreader has been especially designed at the experimental station, Swift Current, to make possible the construction of a simple spreader from stock materials when suitable discarded parts are not available. Tradesmen may also find this type suitable for local manufacture.

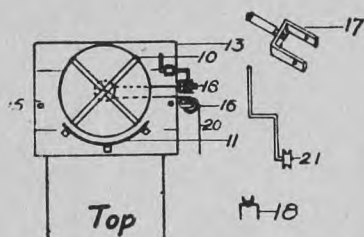
The cone-hopper spreader may be constructed to fit on a wagon or truck box. The machine obtains its power from one of the rear wheels through a belt, preferably round or V-shaped, or a piece of sash-cord to serve as a belt. This is connected directly with the spreader shaft by grooved pulleys, thus avoiding gears. A convenient belt tightener also serves as a clutch. The cone-shaped hopper feeds bait, etc., automatically to the rotating spreader table below. The amount of bait delivered is



regulated by means of a wing-nut on the top.

Parts numbered in the figures are as follows:—

1. Sheet metal cone-shaped hopper, about 36 inches in diameter across the top.
2. Supports for hopper, flat iron,  $1\frac{1}{2}$  by  $\frac{1}{4}$  inch.
3. Support for feed control rod,  $1\frac{1}{2}$  by  $\frac{1}{4}$ -inch flat iron.
4. Lower support for feed control rod,  $1\frac{1}{2}$  by  $\frac{1}{4}$ -inch flat iron.
5. Feed control rod,  $\frac{1}{2}$ -inch round iron, threaded at top end, fork-shaped



at lower end to connect to spreader table shaft below, and secured by a loose-fitting split pin or bolt.

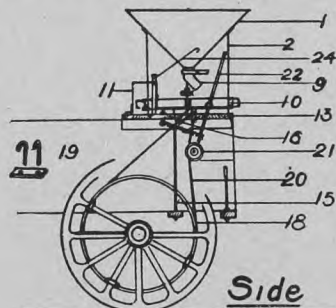
6. Metal cone and two  $\frac{1}{4}$ -inch round iron agitator arms attached to the feed control rod 5.

7. Wing-nut at top end of feed control rod to regulate the size of feed opening between the metal cone 6 and the sides of the hopper.

8. Agitator made of two  $\frac{1}{4}$ -inch round iron arms attached to opposite sides of a collar. Collar fitted with a set-screw to enable agitator to be set in proper position on the feed control rod 5.

9. Sheet metal spout (4-inch rain-water 45-degree elbow) may be turned by means of a handle and clamped in any position so that the bait may be dropped on any part of the table.

10. Spreader table, 30 inches in diameter, consisting of four blades made from 4- by  $1\frac{1}{4}$ -inch lumber fastened to a wood disk, the top of which is covered with sheet metal. A hub with a bore equal to the size of the propeller shaft is required. The hub may be secured to the shaft by two set-screws at right angles to each other or, better still, it



may be keyed and set-screwed. Rubber belting is fastened to the tips of the blades. The pieces of belting should be of sufficient length to just contact the shield No. 11.

11. Shield of sheet metal at back of

the fan blades, about 10 inches high and fastened to wood platform No. 13 by pieces of 2- by  $\frac{3}{16}$ -inch strap iron bent to suit.

12. Grooved pulley about 4 to 6 inches in diameter fastened to spreader table propeller shaft.

13. Wood platform constructed of 2-inch lumber. Hopper and spreader table are mounted on this platform. Platform may be moved back or forward to secure the right tension of the belt. It is secured in position by tightening the tie rods.

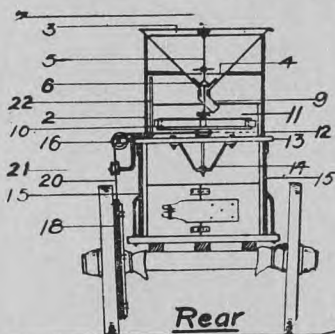
14. Brackets to support the spreader table propeller shaft. Made from 2- by  $\frac{1}{4}$ -inch flat iron. Also holds a bushing or bearing for the lower end of the propeller shaft.

15. Tie rod of  $\frac{1}{2}$ -inch round iron connected to wood platform on top of the box and a 2-by-4 cleat below the bottom of the box to hold platform in position.

16. Grooved guide pulleys about 4 inches in diameter.

17. Swivel bracket for grooved pulley No. 16. Brackets made from  $1\frac{1}{2}$ - by  $\frac{3}{16}$ -inch flat iron. Swivel formed with piece of  $\frac{1}{2}$ -inch pipe over a round iron stem.

18. Pulley or circular band iron drive wheel clamped to wagon wheel. May be constructed from discarded wagon or drill wheel tire and reduced to 36 inches



in diameter. A groove for the drive rope or belt is provided by splitting a piece of  $\frac{3}{4}$ -inch rubber hose riveted around the outside of the drive-wheel. (See small sketch No. 18.) A 14- to 16-inch pulley may be used on truck wheels.

19. Hooks of  $\frac{1}{2}$ -inch round iron and a plate made from  $1\frac{1}{2}$ -inch by  $\frac{5}{16}$  flat iron will serve to clamp circular iron band drive to wagon wheel.

20. Rubber "V" belting or  $\frac{1}{2}$ -inch window sash cord.

21. Grooved tightener-pulley 4 inches in diameter.

22. Crank arm from tightener-pulley made from  $\frac{3}{8}$ -inch or  $\frac{1}{2}$ -inch round iron. Crank arm is pivoted on the wood platform with a plain strap iron bearing or keeper. A coil spring fastened between the platform and crank arm provides tension for the belt.

23. Support for  $\frac{3}{8}$ -inch iron hook.

24. Hook of  $\frac{3}{8}$ -inch round iron holds tightener-pulley in slack position in order to move wagon or truck without operating the bait spreader.

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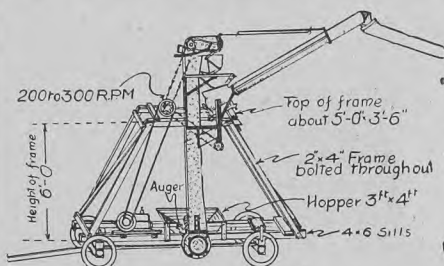
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### Elevator with Weigher

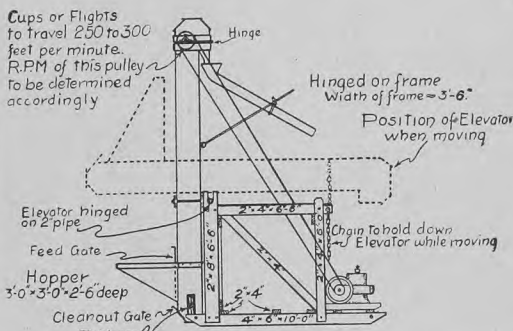
The elevator, the weigher, delivery auger pipe and the bottom auger which leads the grain into the boot of the elevator at the bottom, are obtained from a discarded threshing machine. The whole assembly is remounted on trucks or a trailer in the same position as it was on the original threshing machine. A hopper is built around the bottom auger. The 2x4-inch framework supporting the elevator, weigher and drive shaft is mounted on two 4x6-inch sills about 12 to 14 feet long. A 2 to 3 horse-power engine is fastened to a platform on the sills. This type of ele-



vator is desirable where grain threshed by a combine is stored in granaries on a farm or wherever it is desirable to record quantities of grain being stored or otherwise disposed of.

### Vertical Cup Elevator

Cup type elevators are usually most suitable in permanent locations where grain is to be elevated vertically where than 20 feet. Cups or flights may be attached to either belts or chains. When a belt is used, the elevator should be kept perfectly upright so that the belt will run true on the pulleys. The cup type or flight type elevator should be driven at the top. The pulley in the head of the elevator, not exceeding 20 feet in height, should not be less than 12 inches in diameter when belts are used for holding the cups. Larger head pulleys are required for greater heights to prevent slippage of the loaded belt. A bucket elevator, having 6x4-inch cups, spaced 12 inches apart on centres and travelling 200 feet per minute, will deliver about 250 to 300 bushels per hour. About 1 to 1½ horse-power is required for a 20-foot elevator.

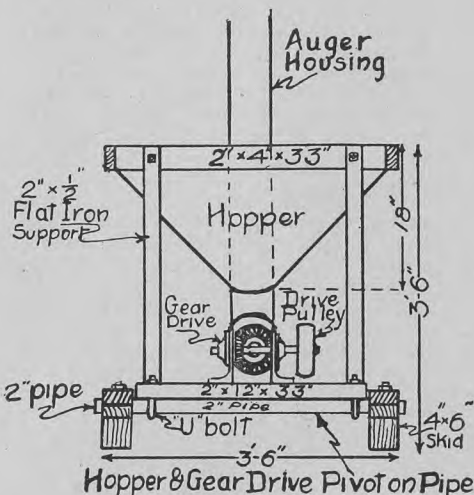
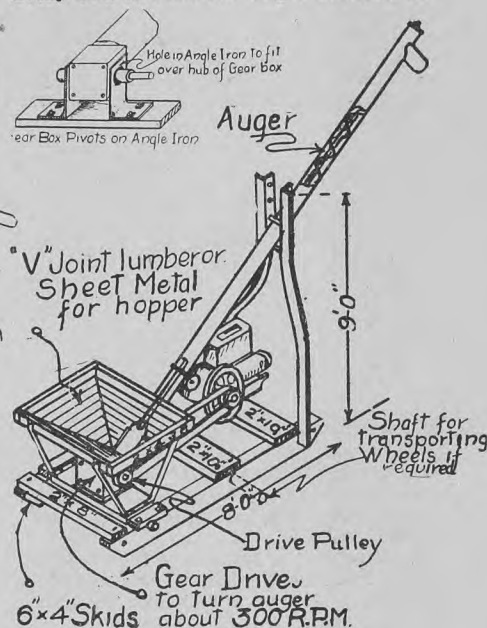


Note - Elevator can be driven from bottom of elevator leg but best results are obtained when driven from top as shown in sketch.

### Portable Grain Elevator

#### Auger Type

The auger type elevator is an easy type to build. It can be made self-cleaning and, therefore, especially suitable to seed growers. The auger can be made to remove the awns of barley and oats by restricting the flow at the delivery end so that the auger is made to



churn the seed against pressure. A bevel gear assembly, either open or enclosed in a housing, is required to drive the auger at the bottom end. The main bearings of the bevel gear assembly or the bearing hubs of the gear box should be made to protrude through heavy angle iron supports. The auger can then be raised at any angle without interfering with the drive shaft. The hopper is supported on 2x½-in. iron straps

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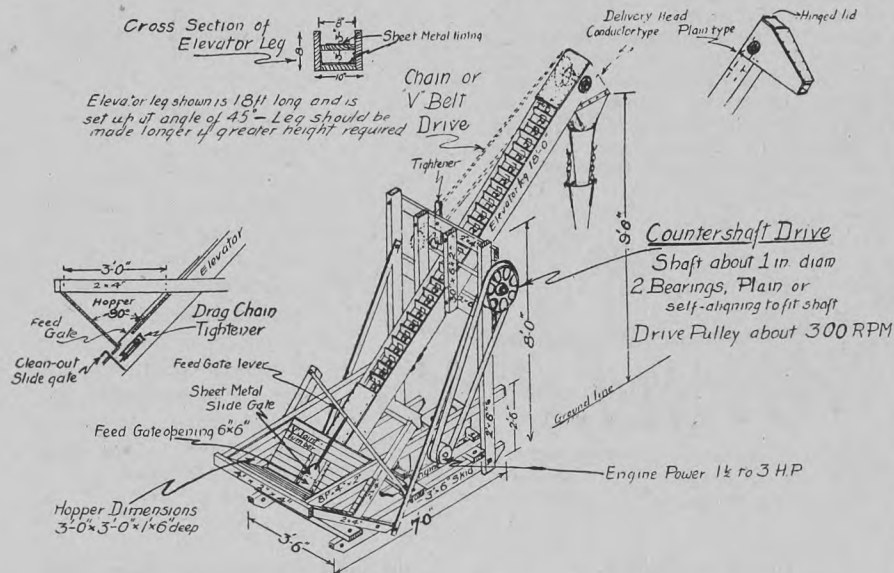


or brackets. A sheet metal feed gate is required to control the flow of grain into the auger. A four-inch auger, turning 300 r.p.m. at about a 45 degree angle, will deliver about 175 bushels per hour and require about  $1\frac{1}{2}$  horse-power. A six-inch auger, operated at the same speed and angle, will deliver about 400 bushels per hour and require 2 to 3 horse-power.

### Portable Grain Elevator Drag or Flight Type

This type of elevator may be found on many of the old threshing machines. Such elevators are best driven from the

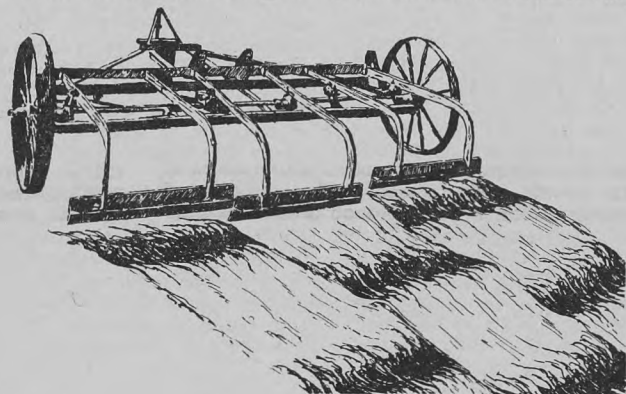
top to prevent buckling of the loaded flights. When driven from the bottom, the flight chains must be kept tight at all times to avoid buckling. Wheels can be used instead of skids. Skids on the ground, however, prevent undue vibration and permit easier shovelling into the hopper. The hopper is supported on its own framework rather than on the leg. Wood with sheet metal lining makes the strongest and most suitable hopper. The framework supports both the counter shaft drive and the elevator leg. Heavy gauge sheet metal makes the best slide feed gate. An 18 to 20 foot elevator, with  $6 \times 2\frac{1}{2}$ -inch flights, will elevate 100 to 200 bushels per hour using  $1\frac{1}{2}$  to 2 horse-power.



### Blade Damming Machine

This machine is suitable for making shallow dams on fallow or loose soil. An old cultivator or drill frame can be adapted to supply the frame for this machine. The cams from an ordinary plow or cultivator lift are mounted on the main axle. They are arranged so that each blade is lifted and dropped in succession. The shape of the cams is altered by means of an acetylene torch, as shown in the sketch. Cam rollers from the plow or cultivator lift are attached to the arms or beams which

carry the blade. The beams can be made from  $2\frac{1}{2} \times 1\frac{1}{2}$ -inch steel. A piece of  $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$ -inch angle iron 3 feet long is fastened at the rear to each pair of arms. A piece of road grader blade, 3 feet long, is bolted to the angle iron. As only one blade at a time is in contact with the ground, the draft of the machine is quite light. It can be used separately, but more economically when hitched behind another implement, such as a cultivator, so as to leave the land protected against soil erosion.



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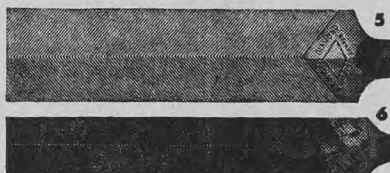
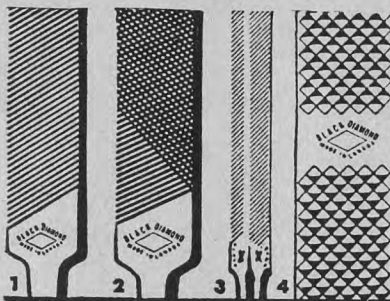
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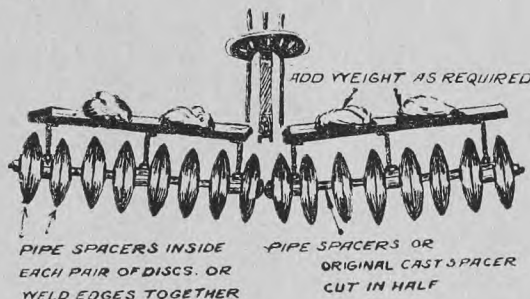
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## Disc-Harrow Packer

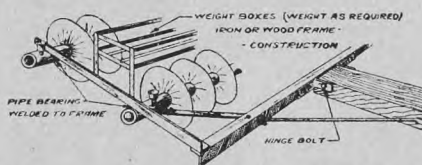
The one-way disc seeder frequently leaves the soil loose. The germination of the seed is then often delayed and uneven. A light packer hitched behind the one-way will pack the soil closer to the seed to encourage quicker and more even germination. Under some conditions, it will also help to retard drying out of the soil.

An old disc harrow can be converted into a suitable packer. Extra discs from another old disc harrow are required. Two discs are placed together as shown in the sketch. The edges should be welded together at 5 or 6 places. The original spacers on the disc harrow may be cut in half for spacing the packer discs. Pieces of pipe may also be used for the purpose. Weights may be placed on the original weight carrier as required. The machine can be converted back to a disc-harrow by simply replacing the packer gangs with the original disc-harrow gangs. In this way the disc-harrow frame can serve for either disc harrowing or packing purposes.

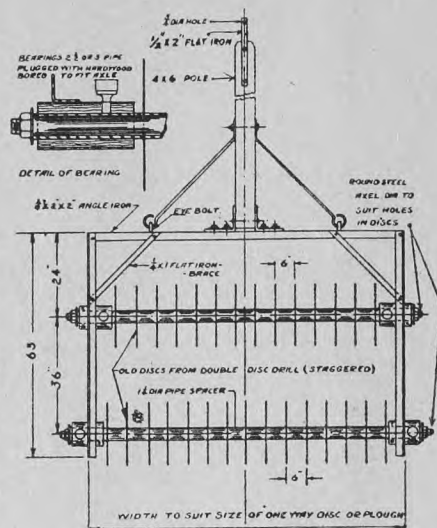


## Drill-Disc Packer

This type of packer is most suitable for lumpy soils and where heavy trash is encountered. It can be made in any



width so that it can be used behind any seeding machine. Old discs from double disc drills are used as packer wheels. The disc packer wheels are spaced six inches apart with pieces of 1 1/4-inch pipe. The bearings also may be made with pieces of 2 1/2 to 3-inch pipe, plugged with hardwood. Holes are bored through the hardwood to fit the pipe axle. A piece of 3/4 or 7/8-inch round iron or steel rod is used to hold the discs and spacers tightly together. The rod is threaded at both ends and fitted with nuts and washers. The 2 1/2 or 3-inch pipe bearing is welded to the angle iron frame. Note that two gangs are used. These are spaced 36 inches apart between the axles. Also note that the two gangs are staggered so that the discs of the rear gang run between the disc tracks made by the front gang. The frame may be

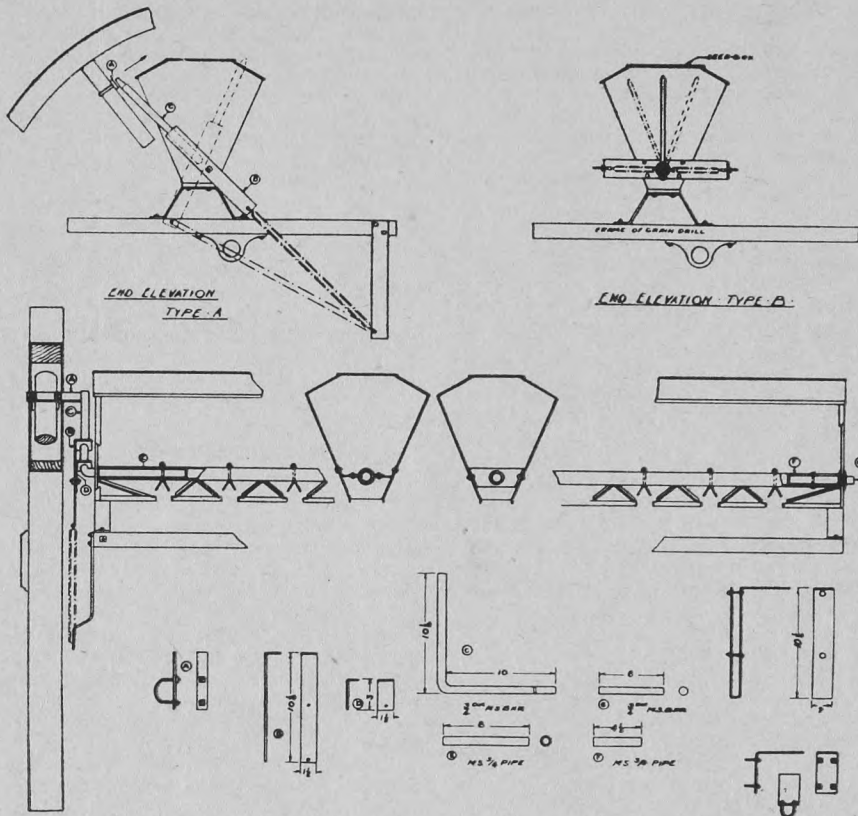


made with 2x2x1/4-inch angle iron for machines up to six feet in width, and 2 1/2x2 1/2x1/4-inch for machines up to 10 feet in width. A weight box can be added as shown in the sketch for holding stones, etc., for additional weight. The tongue and brace rods are hinged to the main frame as shown.

## Light Seed Agitator for Grain Drills

Light seeds, such as brome grass seed and other grass seeds, are often difficult to seed with the ordinary grain drill, unless some means of continuous agitation is provided. A piece of 1-inch pipe fitted with 3-inch split cotter pins, supplies a good means of stirring the seed inside the seed box. Holes are drilled in the pipe for the cotter pins. The holes and pins are spaced 6 or 7 inches apart to suit the spacing of the drill feed cups. The ends of the cotter pins are spread so they cannot come out of the holes in the pipe. At the same time the opened ends of the cotter pins are used to stir the seed just above each feed cup. This is accomplished by providing a vibrating or oscillating motion by means of a crank outside of one end of the seed box. A striker plate is clamped to one spoke of the drill wheels. The striker plate moves the crank arm forward as the drill travels over the ground. A spring pulls the crank arm back sharply. This quick motion is then imparted to the seed agitator bar in the seed box. Two methods for constructing the vibrating crank mechanism are used. Fuller details for construction may be obtained from plans supplied by the Dominion Experimental Station, Swift Current, Sask.





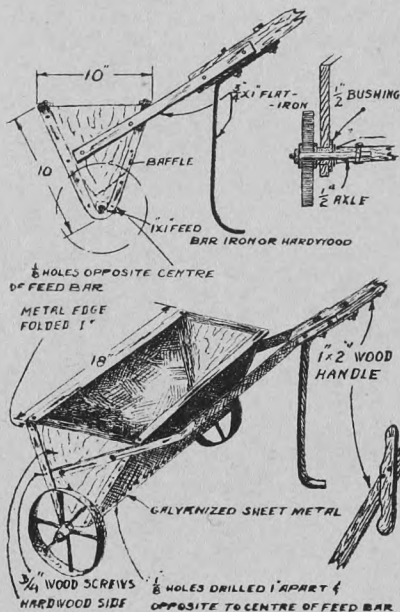
Light Seed Agitator Bar Attachment for Grain Drills.

### Fertilizer Distributor

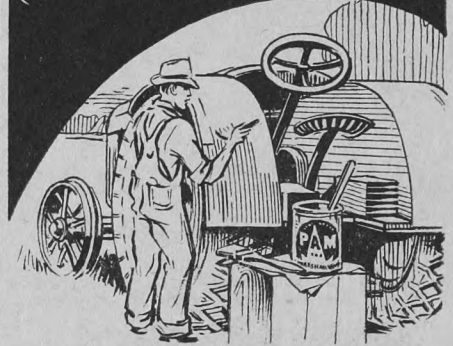
This fertilizer distributor is made of wood, sheet metal, some 1x $\frac{3}{4}$ -inch flat iron and two wood or metal wheels about 8 to 10 inches in diameter. Hardwood about  $\frac{3}{4}$  inches thick is used for the two ends of the hopper. A piece of 28 gauge galvanized sheet iron 27x20 inches is used for the sides of the hopper. The top edges of the metal sides

are folded twice to make the hopper rigid and prevent the raw edges from cutting the hands. The sheet metal is also folded over the hardwood ends and fastened with  $\frac{3}{4}$ -inch round head screws about 2 inches apart. A hole is bored in each of the hardwood ends to fit a  $\frac{1}{2}$ -inch bushing such as a Ford Model T brass spindle bushing. The hole for the bushing is bored 2 inches (on centre) from the bottom. A piece of 1x1-inch hardwood or iron 16 inches long is used as a feed device. A  $\frac{1}{2}$ -inch hole is drilled into each end of the feed bar to a depth of 2 $\frac{1}{2}$  to 3 inches. Two  $\frac{1}{2}$ -inch diameter steel axles, about 8 or 9 inches long, are fitted to the feed bar and secured with  $\frac{3}{16}$ -inch stove bolts or cotter pins after they are assembled in the hopper.

The wood handle and flat iron braces are bolted to the hopper at an angle suited to the user. A flat iron rest is bolted to the handle to keep the hopper upright so as to prevent the fertilizer falling out when the machine is standing alone. Fertilizer outlet holes are drilled one inch apart and in a straight line and immediately opposite the centre of the feed on a horizontal plane. The holes are  $\frac{1}{8}$ -inch in diameter. A baffle board or metal plate is fastened inside the hopper as shown in the sketch. This is necessary to prevent the fertilizer from becoming packed at the bottom by the weight of the fertilizer above. Both drive wheels may be fixed to the shaft with set screws where there is not much turning. Where there is a great



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deal of turning, one of the drive wheels can be left loose so that it can revolve freely on its axle and facilitate turning. In operation the feed bar revolves and the square edges act like small paddles, which pile the fertilizer over the feed outlet holes, through which it falls to the ground. The holes may be made slightly larger to apply more fertilizer to suit local requirements. A slide adjustment can be added to vary the size of the openings. This, however, is not shown in the sketch in order to make the construction as simple as possible. If a heavier application of fertilizer is required, the machine can be pushed over small areas two or three times with ease in very little time. For applying fertilizer along side of drill rows, the feed openings not required can be closed temporarily by bolting on a strip of metal or wood on the outside of the openings, using two or three of the non-wanted feed holes for the small bolts to hold the covering strips.

### Wind Blast Seed Grader

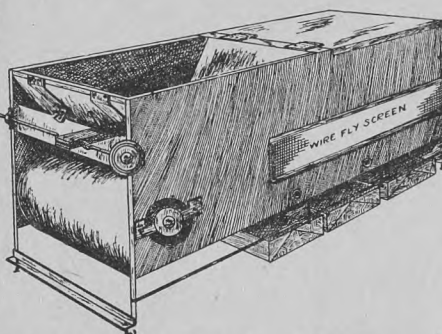
Many light and small seeds cannot be graded satisfactorily by means of sieves or other mechanical means of measurements. Such seeds, however, can often be graded according to weight by means of a wind blast from a fan as used in the common fanning mill and various other types of seed cleaning machinery. To make more use of the wind grading method of separation, a wind blast machine can easily be constructed. The chief parts are:

1. A simple wood or iron frame, sides and wind chamber enclosed with wire mosquito screen at one end.

2. A hopper with slide control feed gate.

3. A vibrating pan below the feed opening of the hopper to feed the seed in an even thin stream into the wind blast.

4. A crank shaft or an eccentric on shaft with a short pitman arm to pro-



vide a vibrating motion to the feed pan. The length of stroke should be about  $\frac{1}{2}$ -inch and the number of vibrations should be about 400 per minute.

5. Two pillow block bearings for the crank or drive shaft.

6. A fan and housing to provide the wind blast. These may be obtained from an old fanning mill or a small harvester combine or threshing machine.

7. Two adjustable divider boards and "V" shape partitions for separating the seed into three grades as it falls.

8. Three pans or boxes to catch the graded seeds.

9. Two bearings for the fan shaft. These can be two ordinary plain bushings fitted loosely in a hole in a bar of

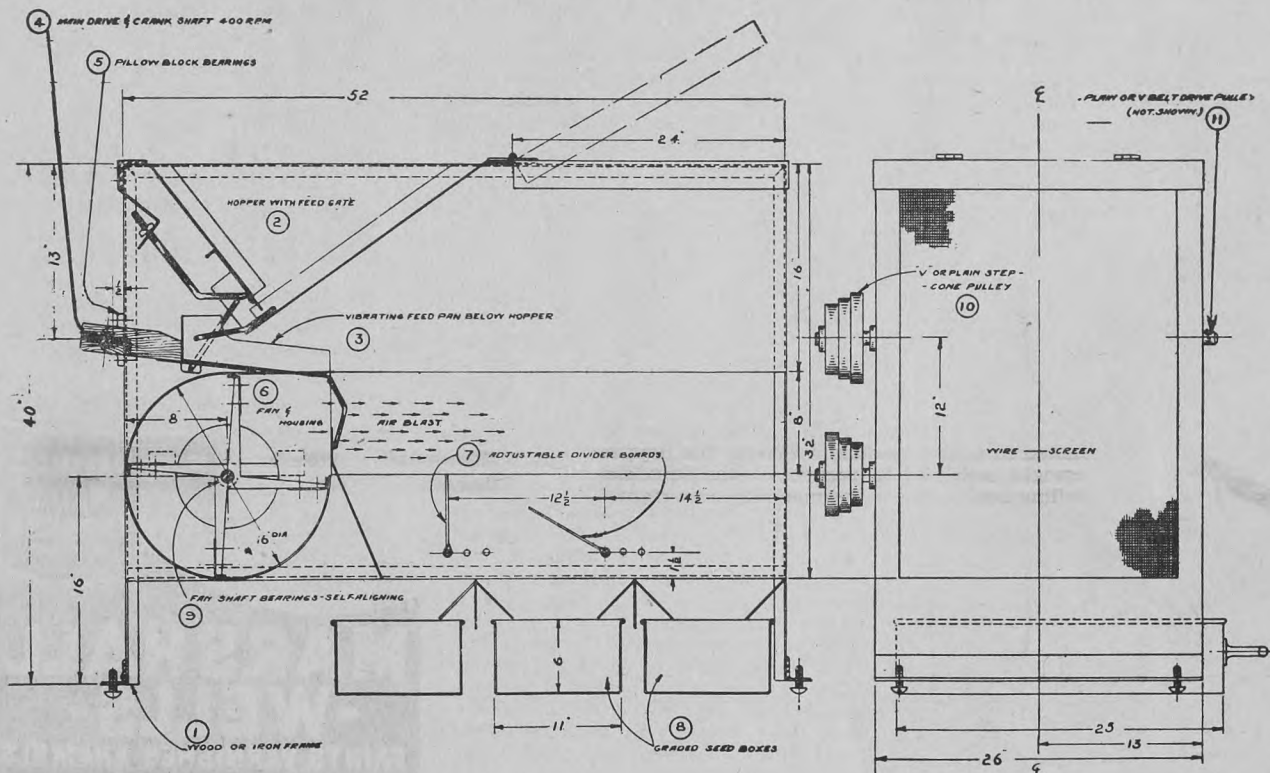
strap iron so that they will be self-aligning. The bar is fastened across the air inlet on each side of the fan housing.

10. Two "V" belt step pulleys each having three to four different size pulleys. These can be purchased at small cost. One is fastened on the fan shaft. The other is fastened on the main drive or crank shaft. A rubber "V" belt or a piece of  $\frac{1}{2}$ -inch round leather belting, such as is used for washing machine drives, is used to run the fan from the drive shaft. An adjustable idler pulley may be required to take up the slack in the belt.

11. A plain or "V" belt pulley is used for the main drive pulley, which is fastened to the drive shaft. Speed of this drive pulley should be about 400 r.p.m.

### OPERATION

Seed is placed in the hopper. The feed gate is opened so that the seed is fed in a wide thin stream into the horizontal air stream from the pan. The fan blast is controlled by means of regulating the speed of the fan with the aid of the step cone pulleys. Further control can be effected by varying the amount of air admitted to the fans by the conventional type of slides on each side of the fan housing. As soon as the machine is set in operation, the divider boards are adjusted to separate the seed as it falls through the air blast into three grades so that each pan below will contain grades of seed as required. If it is desired to use sacks instead of pans or boxes to catch the seed, the machine can be set up on a stand high enough for the purpose and the sacks hung below the machine.

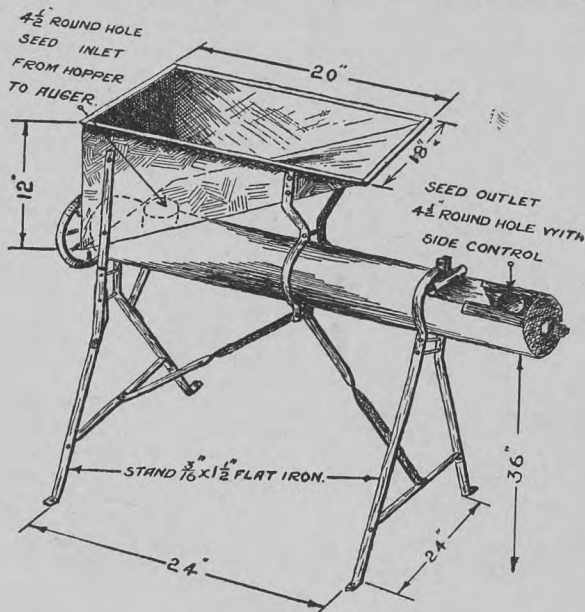




## Seed De-Awner and Dresser

Awns of barley and oats and appendages of other seeds may be removed with a combined auger and peg machine. Seed to be treated is placed in a hopper. The seed passes through a  $4\frac{1}{2}$ -inch diameter hole into the auger housing. The combined auger and steel pegs revolve 300 to 500 r.p.m. depending on the kind of seed to be processed. As the auger and pegs revolve, the seed is

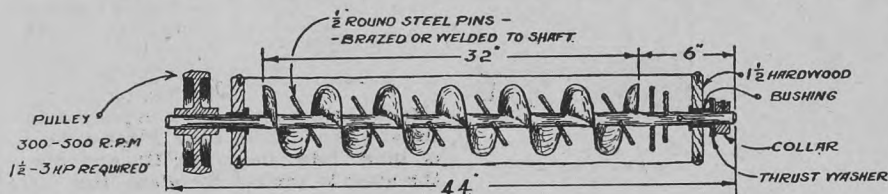
44 inches long. The auger flight is 32 inches long so that 6 inches of the auger shaft protrude at each end. The auger shaft is drilled with  $\frac{1}{2}$ -inch holes to receive  $\frac{1}{2}$ -inch round steel pegs or pins as shown in the sketch. These are brazed or welded in the holes. The length of the pegs should be equal to the diameter of the auger. The auger housing is fitted with a hardwood disc 1 to  $1\frac{1}{2}$  inches thick at each end. Plain iron



moved along so that both the auger and the pegs break off the awns, etc. Three pegs arranged in a spiral at the end of the auger shaft complete the de-awning process and force the seed upwards and out of the  $4\frac{1}{2}$ -inch opening in the end of the housing. When the awns, etc., are difficult to remove, the opening in the end of the auger can be partly closed by means of a slide with a sloping cut-off edge. When the outlet hole is partly closed the auger then compresses the seed in order to force the seed through the reduced outlet. The revolving auger and pegs working in the closer packed seed are then able to break off the tougher awns, etc. The slide at the outlet is the only control required, and this is used solely to meet the varying needs of the different seeds. The machine is cleaned out by turning it upside down and sloping it downward towards the outlet end. The auger is revolved by hand to complete the cleaning.

A 6 or 7-inch auger, such as found on many combine harvester threshers, is used. The auger shaft should be about

or brass bushings in the ends serve as bearings. The auger housing is fastened to the wood discs with  $\frac{3}{4}$ -inch wood screws. The  $4\frac{1}{2}$ -inch round openings at each end are cut with a cold chisel using a round fence post for a block. The opening is then filed smooth. Note inlet opening is on top of the auger housing, while the outlet opening is placed a little on one side so that the seed will fall only on one side of the auger housing. Do not make the outlet opening in the bottom of the auger housing, as that will reduce the efficiency of the augers and pegs in the de-awning process. The slide and guides are made of about 22-inch gauge sheet metal. The drive pulley may be of the popular "V" belt type or just a plain kind. Speed of the drive pulley can be from 300 to 500 r.p.m. Use as large size diameter pulley as possible. The legs and braces are made of  $1\frac{1}{2}$ x3/16-inch flat iron. This can be bent cold to the desired shape. Drill 5/16-inch holes as required and use 5/16-inch machine bolts and washers for assembling.



# FARM ANIMALS USE UP

# SALT

## JUST AS YOUR TRACTOR USES UP OIL

You wouldn't think of running a car or tractor that was short of oil...

But do you realize that all farm animals USE UP SALT just as farm machinery uses up oil? And that an animal's salt balance can only be maintained by a daily salt ration?

Cows put one ounce of salt in every 3 gallons of milk. Horses lose one ounce of salt in every 14 pounds of sweat. Sheep put salt into their fleece and hens put salt into their eggs. In addition all animals need salt to build bone and muscle and retain stamina and vigour.

No animal, unless it is salt starved, will take more salt than it actually requires. In addition, therefore, to a basic daily ration of one pound of "Windsor" Iodized Stock Salt with each 100 pounds of feed, keep "Windsor" Salt Blocks handy so each animal can fill out its own salt requirement.

Plenty of salt means healthier, more productive farm stock.



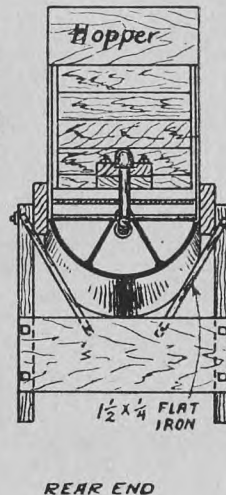
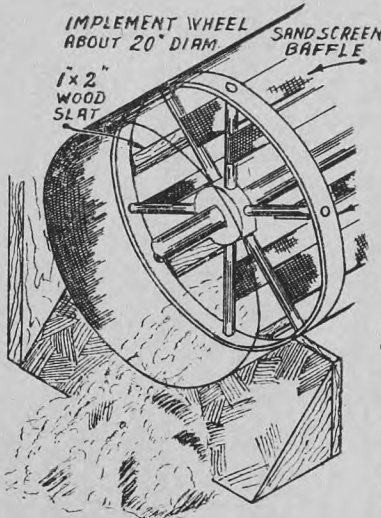
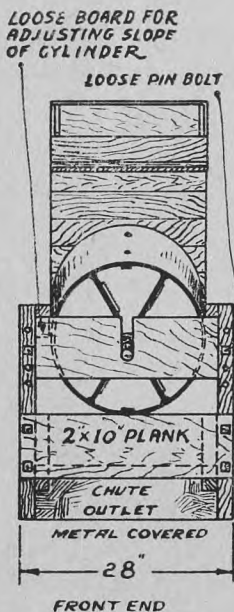
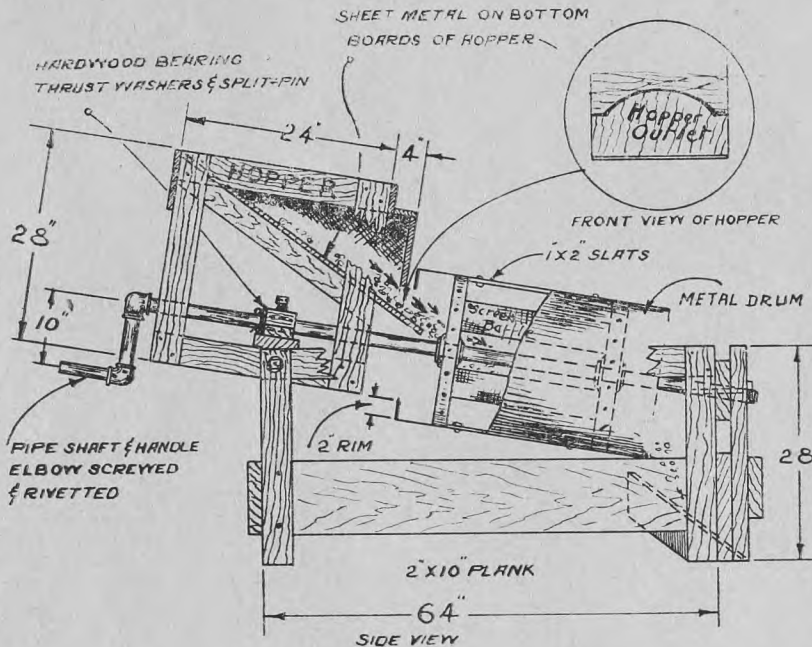
# WINDSOR

IODIZED STOCK SALT  
and SALT BLOCKS

## Feed Mixer

The use of concentrates and minerals requires an efficient feed mixing machine in order that the ingredients can be more thoroughly and uniformly mixed than is possible by hand shoveling. An efficient mixer of considerable capacity can be made with ordinary lumber, some iron pipe and pipe fittings, sheet metal and two old implement wheels about 20 inches in diameter. The hopper and mixing barrel are mounted on the pipe drive shaft so that they can both be moved up or down together and set at a desired angle. To accomplish this the axle bearing is set on the hop-

per frame, which is hinged or pivoted on the main frame. A loose board at the opposite end provides a slot which acts as bearing for the axle at this end. The loose board can be raised or lowered and secured in a selected position by means of two loose  $\frac{1}{2}$ -inch bolts and a series of  $\frac{1}{2}$ -inch holes in the end of the main frame. A crank handle made of pipe fittings, screwed and rivetted, is sufficient for turning at 60 r.p.m. Where there is much feed to be mixed, a pulley can replace the crank and a 1 to  $1\frac{1}{2}$  h.p. engine used to drive the mixer. The speed can then be increased to 100 r.p.m.



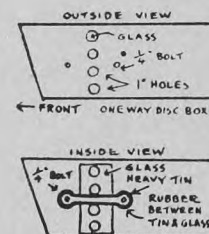
The hopper is made of ordinary 1-inch lumber. Plywood can be used for the bottom. The bottom should be covered with smooth sheet metal so that the feed will slide readily into the barrel. The outlet from the hopper to the barrel should be large and the top of the opening made semi-circular to conform to the shape of the mixing barrel. No feed gate control is required. The slope of the barrel controls the time and thoroughness of the mixing and the feed mix is put into the hopper at the same rate as it leaves the mixing barrel.

The mixing barrel is made of sheet metal. The exact diameter will depend on the diameter of the implement wheels used. These should be from 20 to 22 inches in diameter. The wheels are first secured on the axle shaft about 20 inches apart on centres. Strips of  $\frac{1}{4}$ -inch sand screen, about 6 inches wide, are fastened on the wheel spokes from one wheel to the opposite wheel so as to form screen wire paddles. Galvanized metal, about 24 gauge, 34 inches, is folded around the wheels to form a barrel. The sheet metal is rivetted to the rims of the wheels and along the seam. Wood slats made from 1x2-inch lumber are bolted or screwed on the inside of the barrel between the wheels.

An ordinary pillow block bearing or a bearing made from hardwood is used for the axle shaft at the crank end. A split pin and washer, or a collar with set screw, is required to keep the mixing barrel and shaft from sliding down to the lower end. An ordinary agricultural washer will serve as a wear or thrust washer.

In operation it is desirable to first put prescribed measured amounts of grain, concentrate, etc., in a half bushel measure or in a pail and stir the feed a little. Then empty the measure or pail into the hopper to be more thoroughly mixed by the revolving barrel. As the feed mixed passes from the hopper to the mixing barrel it flows through the wheel spokes. The wood slats carry the feed mix upwards and drop it on to the wire screen paddles. The wire screen paddles serve to disperse the concentrates, etc., more thoroughly through the grain. As the completely mixed feed leaves the mixing barrel, it falls on a sloping chute where it can be shovelled into bags or into a bin or wagon box.

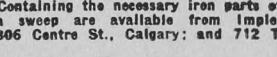
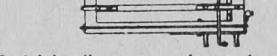
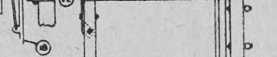
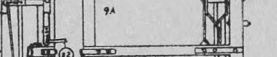
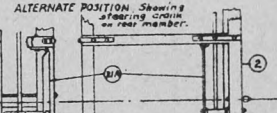
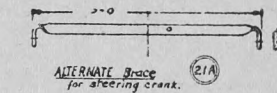
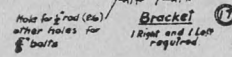
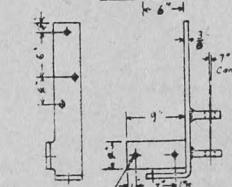
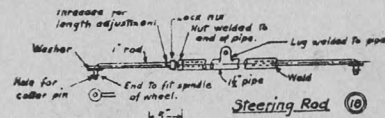
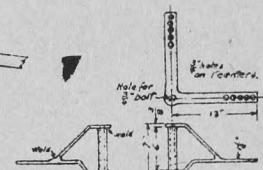
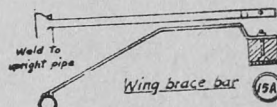
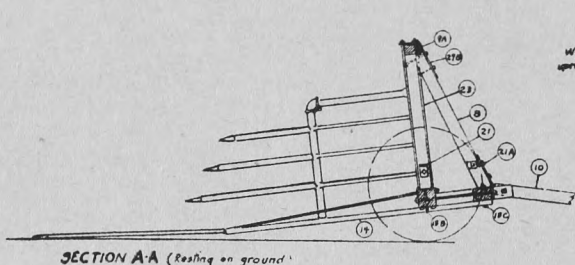
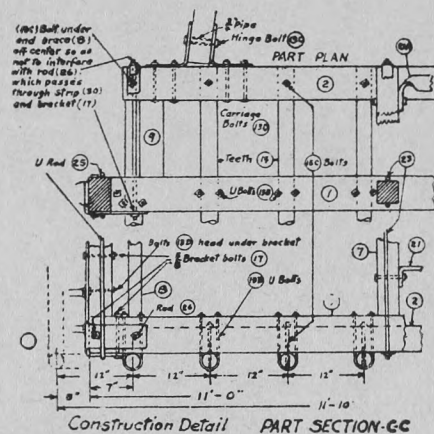
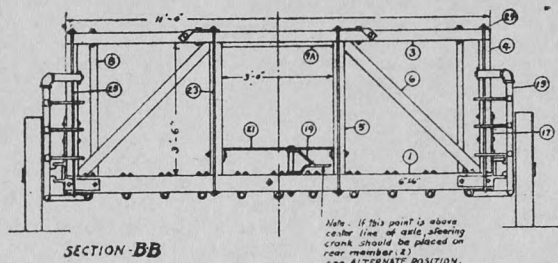
## Watch the Grain



It is a great help to be able to see the level of the grain in the drill from the tractor seat. Drill four one-inch holes in the seeder box in a convenient place for the tractor driver to see. Place a glass on the inside of the box and hold it in place with tin and two  $\frac{1}{4}$ -inch bolts. Place a piece of inner tube under the tin and over the glass to protect the glass from jar.



# The Olds Power Stook Sweep



## STOOK SWEEP KITS

Containing the necessary iron parts of this bill of materials, less wheels and hoist for assembling a sweep are available from Implement Parts Distributors, 10048-101A Ave., Edmonton; 806 Centre St., Calgary; and 712 Third Ave. South, Lethbridge. Price \$69 to Alberta points.

# The Olds Power Stook Sweep designed by F. F. Parkinson

PC No.	PART	Size	Qty.	Remarks	PC No.	PART	Size	Qty.	Remarks	PC No.	PART	Size	Qty.	Remarks
1	Front Base beam.....	6x6x11'-0"	-1		14	Teeth.....	2" pipe x 7'			20	Bolt.....	3/4" x 14"	-1	
2	Back base beam.....	4x6x10'-2"	-1			Brace rods	1 1/2" pipe x 5'	11	welded		Alternate.....	3/4" x 12"	-1	
3	Top beam.....	4x4x11'-0"	-1				3/4" x 4'-6"				Rod.....	1" x 30"	-1	Ends similar to (18)
4	End uprights.....	4x6x 3'-6"	-2		15	Side wings.....	{ 2" pipe 18' 1 1/2" pipe 5' 2" elbow }	1	right welded to out-side tooth.	21	{ Brace.....	1/2" x 2" x 3'-6"	-1	
5	Center uprights.....	4x4x 3'-6"	-2					1	left side	21a	Alternate			
6	Diagonal braces.....	4x4x 4'-11"	-2	First grade spruce or fir S&S	15a	Bars (3).....	1 1/2" x 3/4" x 10			22	Bolts.....	3/4" x 5"	-2	Attach to tractor End similar to (18)
7	Back braces.....	4x4x 4'-2"	-2		15b	"U" Bolts.....	1/2" x 20"	-11	for teeth		Control rod.....	{ 1/2" pipe # 1" rod 18"	-1	
8	End back braces.....	2x4x 4'-2"	-2		15c	Bolts.....	1/2" x 7"	-11		23	Upright rods.....	1/2" x 4'-5"	-4	
9	Spacing blocks.....	4x4x12"	-3		15d	Bolts (4 for each wing)	1/2" x 5"	-8		24	Washer staps.....	3/8" x 1 1/2" x 6"	-4	
9a	Spacing blocks.....	2x4x 3'-0"	-2		16	Hardwood points.....	2" x 8" 2 1/2" x 8"	-13 -6	End to fit 1 1/2" pipe End to fit 2" pipe	25	"U" rods.....	1/2" x 9'-6"	-2	
10	Side beams.....	4x6x14"	-2		17	Brackets.....	3/8" x 4" x 40"	1	right Lugs or spindle welded on.*	26	Horizontal rods.....	1/2" x 2' -1"	-3	
11	Channel.....	6" x 7" 3" x 1/2" x 11"	-1 -2	welded		Bolts.....	3/8" x 5" 3/8" x 7"	-6 -4	with spindle bearing	27	Pulley supports.....	1/2" x 2" x 14"	1	right left
12	Clamp blocks.....	6" x 8"	-2			Tractor wheels.....	6" x 36" di.	-2		28	Chain supports.....	3/8" x 1 1/2" x 5"	-2	
13	Hinge angles.....	3/8" x 4" x 14"	2	A B	18	Steering rod.....	1 1/2" pipe 9'-6"	1			Bolts.....	3/8" x 5"	-2	
13a	Bearings.....	1" pipe x 4"	-2			Rods.....	1" x 3"				Pins.....	1/2" x 7"	-2	
13b	Hinge bolts.....	1/2" x 5 1/2"	-2			Lug.....	1/2" x 2" x 4"			29	Straps (Top) A.....	3/8" x 1 1/2" x 18"	-2	
13d	Bolts.....	1/2" x 7"	-8		19	Steering crank.....	3/8" x 2" x 46"	-1	welded		B.....	3/8" x 2" x 18"	-2	
						Spacer.....	1/2" pipe x 6"	-1			Bolts.....	3/8" x 5"	-8	
						Washer.....	1/2" x 2 1/2" di.	-1		30	Straps A.....	3/8" x 1 1/2" x 15"	-2	
											B.....	3/8" x 2" x 15"	-2	
											Bolts.....	3/8" x 5"	-8	
												1/2" x 7"	-2	

Note ° indicates part is shown in detail drawing

Note \* indicates size or length varies to suit tractor used.

## Horse Drawn Hay Sweep

By studying the drawing, and using the following bill of materials, anyone handy with tools can make this horse drawn hay sweep. It is from a model made by the Dominion Experimental Farm at Brandon.

### Bill of Materials

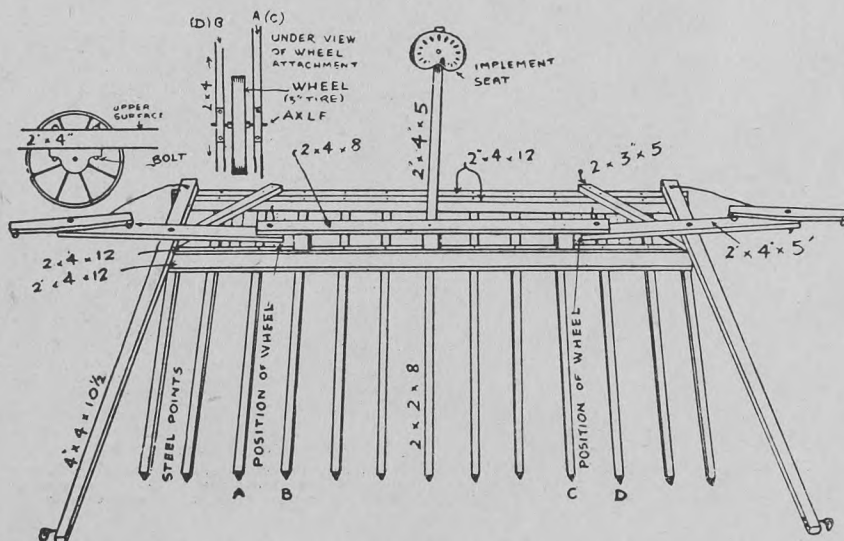
Fingers: 13—2"x4"x8' tapering to about 2" square. Each finger is bolted at the back

end of the frame and to the 2"x4" set on edge at the front.  
Tongues: 2—4"x4"x10' 6". These are offset from fingers.  
Y Braces: 2—5/8" round iron. The two ends extend through the pole. There is a ring at the outer end for the breast strap.  
Corner Braces: 2—2"x3"x5' attached to the frame at the back, front end is between tongue and frame.  
Eveners: 2—and the piece for seat are 2"x-4"x5'.  
Guard Plank: 1—2"x4"x8' supported by

three 2"x4"x8" high. This plank is bolted to main frame by two 3/4"x18" bolts.  
Iron Braces: 2—5/8"x20" from the inner end of eveners back to the main frame.  
Iron Braces: 2—1/2"x30" from outer end of eveners to back end of pole.  
Double Eye Bolts: 4—1/2", two to bolt back end of tongue to frame; two for inner end of eveners.

Wheels: 2—16" in diameter with 2 1/2" or more face. Wheels are between third and fourth fingers.

Axles: 2—1 1/2" piping or similar material, ends to be bolted to fingers or carried on boxing attached to the third and fourth fingers.



## Drawer for Fanning Mill



To prevent waste of grain or scattering of seeds under the fanning mill I made a drawer to put under it. In size and shape it fits exactly under the machine. Nail two small runners on the bottom for easy sliding on the floor or ground. Attach two handles to the drawer so that when it is drawn out from under the mill it can be lifted and the contents dumped in a pile. This makes a fanning mill look more like a complete machine, besides the convenience it makes. I made and use one and it gives satisfactory service. — M. Pilichowski, Rama, Sask.



# "THEY WEAR LONGER..."

*If they bear this label!*

Every G.W.G. work garment carries this trademark. It is your guarantee of the sturdiest, best-looking materials on the market . . . finished workmanship . . . and styles that are right in appearance — more comfortable for working around the farm. These four pages illustrate G.W.G. WORK CLOTHES in action!



G.W.G. COMBINATION COVER-ALLS are protective from shoulder to toe . . . with action-free, raglan sleeves . . . large pockets . . . reinforced seams . . . and fabrics that are Sanforized-Shrunk.

*Made from extra-heavy white duck. Also available in khaki drill.*

*Made from Express Stripe 'Snobak' denim.*

*Made from blue 'Snobak' denim.*



# THE FARM... A WORKSHOP...

*Where everyone lends a hand!*

## Farming - a Family Enterprise!

On your farm, no one shirks through the day . . . there's a vital job for Dad, Mother, Sister and Brother. Each one knows the value of "teamwork" -- the importance of sharing tasks -- to invest Spring energy in Autumn results!

Spring energy on the farm demands work clothes -- but not ordinary work clothes. G.W.G. garments are constructed to maintain their hardy good looks through months of farm life . . . and there's a G.W.G. design for the style that you prefer. For instance:

FOR DAD: G.W.G. WORK SHIRTS, worn with G.W.G. IRON MAN PANTS or RED STRAP OVERALLS.

FOR MOTHER: G.W.G. CLOTHES.





FOR MOTHER: Garments "just like Dad's" . . . but in smaller editions, of course.

FOR BROTHER: Garments "just like Dad's" . . . but in smaller editions, of course.

FOR SISTER: Slacks that complete the mother-daughter fashions which are so popular today.



#### RESEARCH

Daily, new discoveries are made in clothing manufacture -- equipment, material, design or finish. G.W.G.'s Research Department is equipped with the finest testing apparatus-- everything must measure to highest standard. That standard is raised each time that better equipment, methods and materials can be obtained.



THE GREAT WESTERN GARMENT CO. LTD.  
EDMONTON ALBERTA

Your dealer receives a quota of the Work Garments produced in the G.W.G. Plant. This quota will increase gradually, as more fabrics are available. If he is temporarily out of the garments you want, rest assured that he will have G.W.G. WORK CLOTHES in stock again.

# "TEXAS RANGERS"

THE G.W.G. "TEXAS RANGER" SHIRT is tough enough to see action on the farm . . . cool and light for hot weather. Attractive colors . . . smart details, such as pockets, buttonholes and shoulder lines. . . and the cotton twill material that wears longer—this is the G.W.G. TEXAS RANGER SHIRT!

Illustrated are G.W.G. pants of famous "Snobak" denim—G.W.G. Iron Man Pants—and G.W.G. khaki pants . . . all made for both men and boys.





## Farm Seed Cleaner and Grader

This is the farm seed cleaner and grader designed by H. J. Kemp of the Swift Current Experimental Farm. The inclusion of a wind grading board with an adjustable slope is believed to be the chief difference as compared with the general features of factory made machines. The following is the bill of materials:

### Lumber

- 6 pieces 2"x4"x10', pine, spruce or soft fir.
- 4 pieces 1"x10"x10' No. 1 shelving.
- 2 pieces 1"x5"x10' No. 1 shelving.
- 3 pieces 1"x4"x10' No. 1 shelving.
- 8 pieces 1"x2"x12' No. 1 shelving.
- 2 sheets 1/2"x4"x8' fir veneer plywood.
- 1 piece 2"x4"x4'—oak.
- 1 piece 1"x6"x6'—oak.

### Metal

- 2 sheets galvanized iron, gauge 26—size 8"x2 1/2'.
- 2 pieces cold roll steel shafting 4' long x 3/4" diameter.
- 1 piece cold roll steel shafting 3' long x 3/4" diameter.
- 3 pieces round iron 10' long—3/8" diam.
- 1 piece angle iron 1 1/2"x1 1/2"x 1/2" thick, 3' long.
- 1 piece flat iron 1/4"x2"x6'.
- 2 bearings for 3/4" fan shaft—self aligning bushing type.
- 2 bearings and brackets for 3/4" drive shaft.
- 1 piece of 1/2" or 3/8" pipe 36 inches long.
- 1 drive pulley 2" to 2 1/2" face, diameter sufficient to turn drive 450 to 500 r.p.m.

Miscellaneous bolts, screws and nails.

General views of the machine are given in Figs. 1, 2, and 3.

The main frame is constructed with ordinary 2"x4" and No. 1 Shelving. Legs and sides are bolted together with 5/16" bolts. Three 3/8" round iron truss rods are used at each end. The sides of the hopper are of shelving and the bottom parts and feed gate of 1/2" veneer. An agitator is provided to keep the grain moving and the feed gate is adjusted by 5/16" rods bent one inch and inserted in the gate. The rods are fitted with wing nuts. The agitator connects with the shoe. These parts are shown in detail in Fig. 8.

A perspective view of the shoe is given in Fig. 4, inside width 28", length 48". This provides for a wood screen frame 42"x28". The difference is taken up with a metal spreading pan, a piece of plain sheet metal 10"x28" placed at the top end of the screen. Each discharge chute is fitted with a tilting conductor board so that the material may be discharged at either side of the machine. The tilting board should be covered with sheet metal. For the sides and bottom of the shoe and bottom of the chutes 1/2" fir veneer is recommended.

The bottom of the shoe should be covered with light sheet metal and supported by three cross battens of 1"x4". The shoe is suspended on two front and two rear hangers, details of which are shown in Figs. 10, 11 and 12. The shoe shake is 1/2". This motion is provided by two pitmans and two eccentrics. The eccentrics are attached to the drive shaft, which revolves at from 350 to 400 R.P.M. The front end of each of the pitmans is connected with the shoe by means of two angle iron brackets.

The rear hangers, Fig. 10, are hardwood, connected with the shoe with

angle iron brackets similar to the pitman brackets. The lower end of the rear hangers hinges on a 5/8" steel shaft, Fig. 12. The front iron hangers (Fig. 11) suspend on pipe bushings bolted to the side of the main frame. The lower ends of the front hangers are connected with a 1/2" rod which runs through a piece of pipe under the front end of the shoe as shown in Fig. 1.

Half-inch veneer wood is used to make the sides of the fan housing. The sheet metal forming the fan housing is continued on to the top and bottom fixed baffle boards which give direction to the wind blast, Fig. 1. The arms of the fan, Fig. 7, are of hardwood. A saw cut 3" long is made on each side of the hole so that the arms can be compressed to the shaft by two 1/4" bolts. The fans are of 1/2" veneer wood. Binder pitman bearings or other similar bushing bearings may be used for the fan shaft. A piece of pipe with washers between the bearings and the fan arms will serve as spacers to keep the fan centered. The fan blast is controlled by three stepped pulleys and slides. The combination of the fan speed and the amount of air admitted to fans provides excellent control.

The wind grading board, Fig. 5, is important. This is made up of 1/2" veneer, supported by a frame of 1"x2". An opening 4" wide is provided to allow lighter seeds to fall through. This opening is also fitted with a hinged door so that it may be adjusted as required. The lower 26" length of the board is covered with sheet metal in order to allow seeds to slide up or down freely. The sides of the sheet metal are turned up about 3" to keep the seed on the board and help give direction to the wind blast. The entire grading board is hinged on two bolts on the lower end so that the angle of the board may be changed. Three or four holes in the main frame are provided to receive a 5/16" iron rod which supports the top end of the grading board at the desired angle.

The two cone pulleys as shown in Figs. 2 and 3 have three steps to provide three speeds. The pulleys are equal in size. They may be constructed by assembling circular discs cut from 1/2" veneer wood. For the two pulleys, the following are required:

- 4 discs 11" in diameter.
- 2 discs 9 1/2" in diameter.
- 2 discs 9" in diameter.
- 2 discs 8" in diameter.
- 2 discs 7 1/2" in diameter.
- 2 discs 6" in diameter.

A 3/4" hole is bored in the centre of each disc to take the drive shaft. The layers are glued and nailed together with two iron plates 4"x4"x1/4" to reinforce the pulley and serve as a means to fasten the pulley to the shaft. The assembled pulley is fastened to the shaft by welding the inside plate on to the drive shaft. The outer plate is not welded so that the pulley may be removed by loosening the bolts.

The fan drive belt is made from 1/2" sash cord, half-inch round leather belting or two layers of 1/4" leather 1/2"

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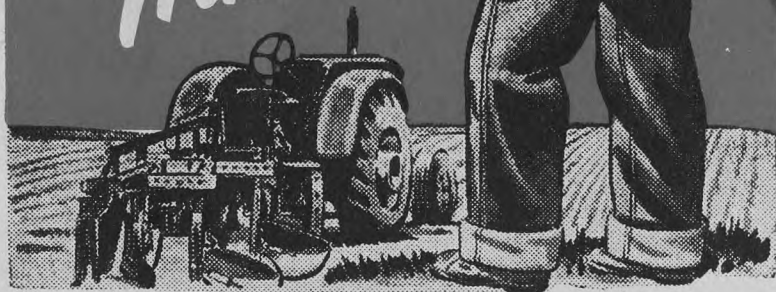


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wide sewn together down the middle. The tightener pulley with a coil spring tension is made from a piece of old binder canvas roller with a hole through the middle to take a piece of  $\frac{3}{8}$ " or  $\frac{1}{2}$ " iron tubing or pipe. This tubing will serve as the bearing. A bolt will serve as the shaft for the roller. The tightener pulley arm may be made from 1"x2" hardwood.

Generally speaking, perforated zinc screens give the best results and last longer as they do not sag so readily as wired screen; also the size of openings do not change as a result of use. The size of the metal screen without frame and spreading pan is 33" long and 27" wide. Plan for making the screen frame is shown Fig. 6. The material used is 1"x2". Beveled 1"x1" strips of wood are used on top of the screen to guide the seed.

**Screen size openings recommended:**

1—Round hole	5/64 inches
1—Round hole	7/64 inches
1—Round hole	8/64 inches
1—Round hole	12/64 inches
1—Round hole	14/64 inches
1—Slot hole	4/64x $\frac{1}{2}$ inch
1—Slot hole	11/64x $\frac{3}{4}$ inch

The above sizes will be useful in screening wheat, oats, barley, flax, some legumes and grasses. Where special sizes are required, a sample of the seed to be cleaned should be sent to the makers of screens, who will advise the size of screen they can supply to do the work required.

About one to one and one-half horsepower is required to drive the machine. The machine can be fitted for hand-power. However, much better work can be done when the machine is run at a uniform speed as supplied by an engine or motor.

**Operation**

1. See that the machine is lubricated and wipe away excess grease or oil.

2. Check the screens required for:

(a) Top screen for removing straw and other large inert matter.

(b) Bottom screen for removing weed seeds, small seed, cracked seed, etc.

To do this place a handful of uncleaned seed on the screen and shake by hand.

3. Set tilting board in weed and straw chute to convey material to the right or left side of the machine as required.

4. Start the machine in operation. Drive pulley on machine should run about 350 r.p.m.

5. Open feed gate so that seed covers above  $\frac{1}{2}$  to  $\frac{2}{3}$  of the top screen.

6. Adjust wind blast by means of wind control slides.

7. Adjust slope of grading board so that heavy seeds fall to the bottom and light seeds travel up the incline and drop through the four-inch opening while the chaff, etc., is blown over the top end of the board. The four-inch opening may be closed if not required.

8. Change speed of fan as determined by inspection of the cleaned and graded seed.



FIG. 1

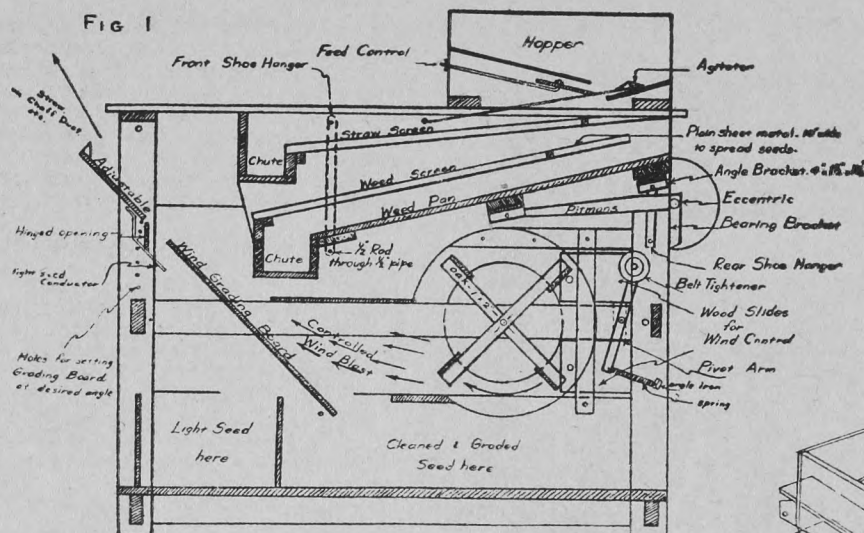


FIG. 2

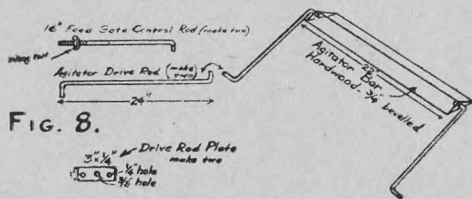
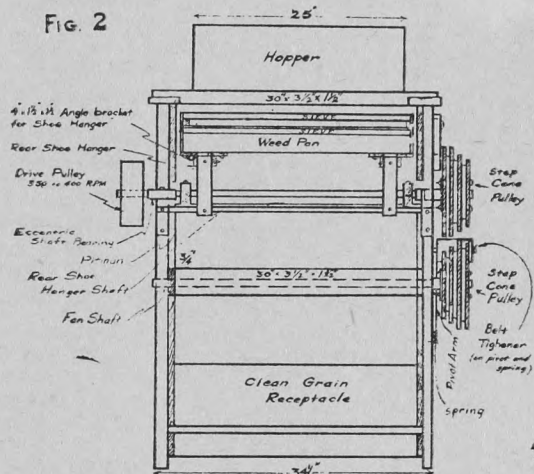


FIG. 8.

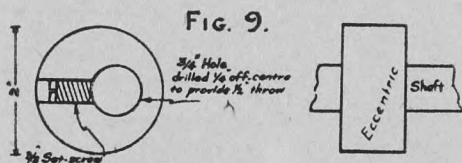


FIG. 9.

Two Pitsmen required - Hardwood - 20x3 1/2 x 2 1/2"

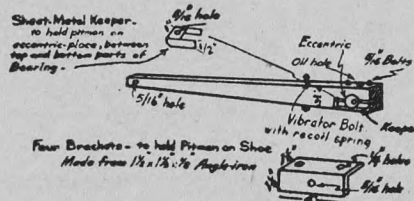
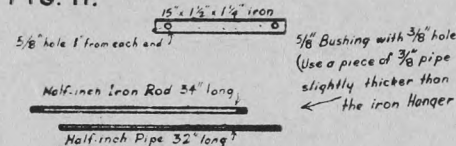


FIG. 11.

Front Shoe Hanger Straps



Pipe fastened on 1 1/4" under front end of shoe. Half inch rod goes through Pipe. Front Hanger Strap and bushing at each end, assembled thus

Hangers attached to frame with pipe put through bushings set in holes in Strap Hangers



FIG. 3

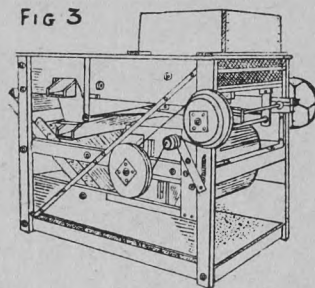


FIG. 4.

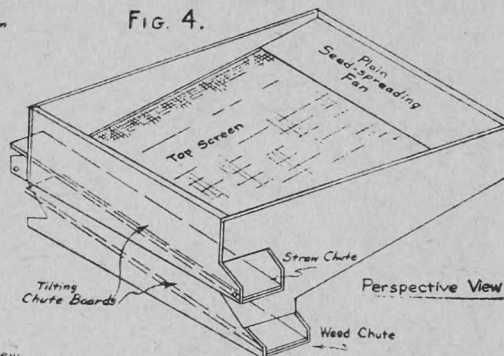


FIG. 5.

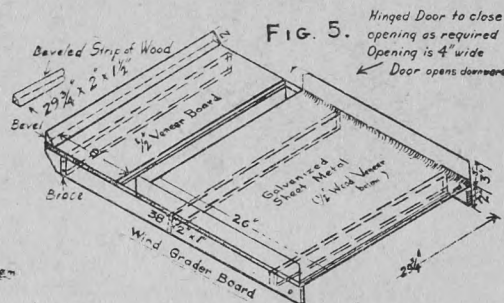


FIG. 7.

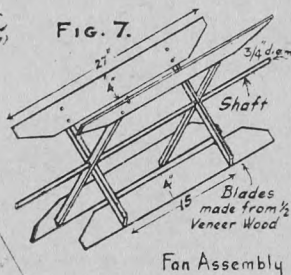


FIG. 7.



Drive Shaft - Cold rolled steel - 40 x 3/4" diam.

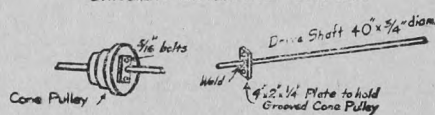
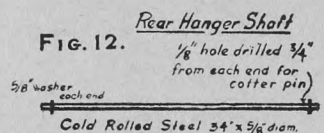


FIG. 10.

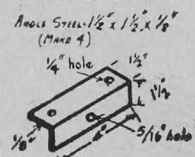


FIG. 12.

Rear Hanger Shaft

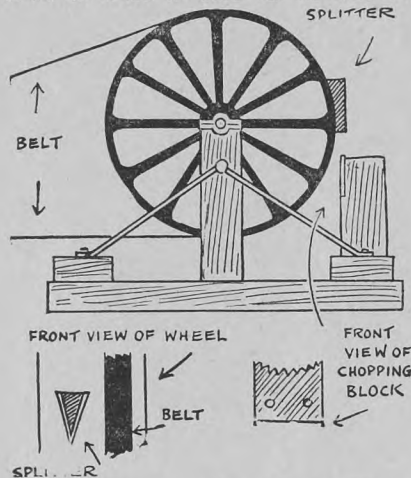


Hanger Brackets



## Wood Splitter

This is the wood splitter that J. H. Cooper, of Neelin, Man., rigged up. He got a pulley from an elevator. It has a 12 inch face. To the rim on one side is riveted a wedge, faced with two leaves of an old auto spring, brought to a sharp edge in front. The splitting block is made as shown, with a notched iron plate. The belt from a 3½ h.p. engine runs on the other side of the wheel. The stick of wood is held on its side and



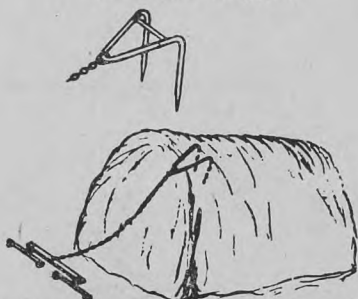
pushed in so that the wedge shaped splitter comes down on it. If the splitter sticks, it simply throws the belt and no harm is done. As fast as a man can feed the blocks to the machine, it will split them.

## Extra Hook on Packers

An extra hook of light steel ⅛-inch by ½-inch, shaped as shown in the diagram and riveted on the packers of a binder make a wonderful difference in the way the binder will handle crops that are weedy, especially with Russian thistle. Every farmer who has handled a binder among weeds knows that trouble is caused by the packers failing to bring the grain down to the knotter. This device will help solve the trouble.



## Straw Pile Stripper

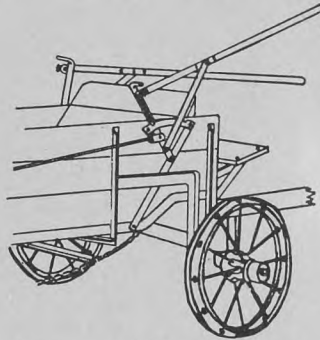


This sketch shows a device for making easier the work of stripping off the wet

frozen surface from the straw pile so as to get at the dry straw. Take an old 12-foot drill shaft to the blacksmith and have him heat and bend it into shape and sharpen the ends as shown. A bar is then welded across to stiffen the device. By pushing down the tines and pulling with a team or tractor, you can quickly strip down to clean straw.—I.W.D.

## Tractor Control for Spreader

For making extension levers on a manure spreader for tractor use, use two pieces of iron 1x¼ inch by 5 feet long and two of the same size but 2 feet long for braces. A hole in the flat



iron extension fits into the spreader lever for raising up and down in notches fastened by the wire. Both sides are alike. The only time you need to stop the outfit is in putting the spreader into gear. You can regulate the feed and take the spreader out of gear from the tractor seat. Spreaders differ, but any farmer should be able to work out extension levers for his spreader, horse sulky plow, disc harrow, etc., with this help.—I.W.D.

## Power Sweep for Hay or Stooks

The time to make a power sweep is not when it is needed but in some slack time, if any, before the crop is ready. This design has simplicity resolved into its simplest elements and at the same time it works. It was designed by S. L. Tallman and Prof. G. L. Shanks, and published by the Manitoba Extension Branch.

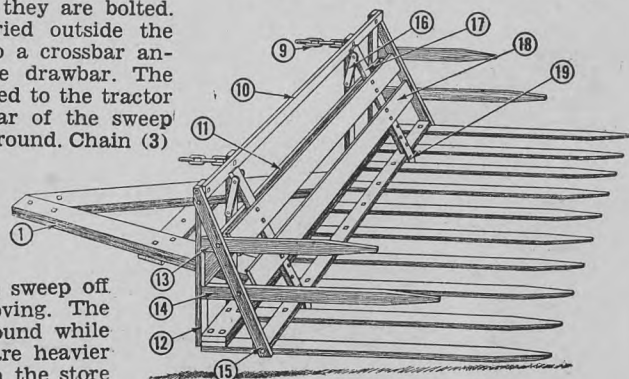
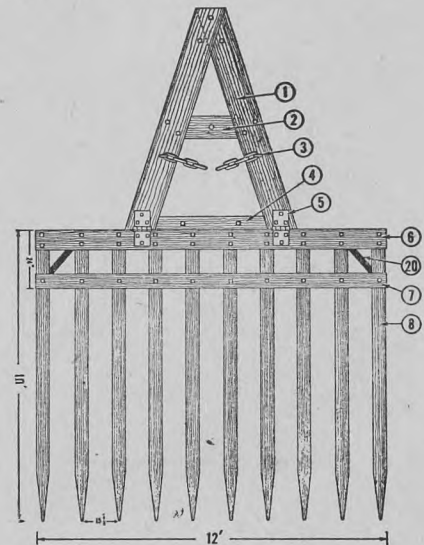
As shown, the push arms (1) are run inside the front wheels of the tractor. The rear of the push arms butt against the drawbar frame or carry to the rear of the drawbar where they are bolted. Or they may be carried outside the wheels directly back to a crossbar anchored securely to the drawbar. The crossbar (2) is suspended to the tractor frame carrying the rear of the sweep eight inches from the ground. Chain (3) on the push arms is fastened to the tractor frame to prevent the sweep from swinging while the other chain (9) is used to lift the sweep off the ground while moving. The sweep runs on the ground while working. The hinges are heavier than can be bought in the store

and are made by the blacksmith. The unloading gate, at (16) is hinged with shoes (19) shaped to slide over the ground with a forward motion, but hook into the ground when you back the tractor, so that the gate starts the load to move off the sweep. The sweep operates most satisfactorily with a rubber tired tractor moving at 6 to 7 m.p.h.

This is the bill of materials:

Item No.	Details
1—Push Arms:	4—2x8 (8' to 10')
2—Cross Bar:	1—2x8 (4' to 5')
3—Logging Chain:	Approximately ¾"x7'
4—Tie Bar:	2—2x4—6'
5—Hinges:	2—¼"x4"—7"
6—Rear Crossbeam:	2—2x8—12'
7—Front Crossbeam:	1—2x6—10'
8—Teeth:	10—2x4—10' clear fir
9—Lift Chain:	Approximately ¼"—15'
10—Top Cross Piece:	1—2x4—12'
11—Middle Cross Piece:	1—1x8—12'
12—Upright:	4—2x4—4½'
13—Side Rail:	2—2x4—7'
14—Side Rail:	2—2x4—9'
15—Diagonal Brace:	2—2x4—5½'
16—Connecting Straps:	4—¼"x1½"—18"
17—Gate Uprights:	2—2x4—4'
18—Gate Boards:	2—1x8—11'
19—Gate Shoes:	2—¾"x3"—18"
20—Diagonal Braces:	2—¼"x2"—2½'.

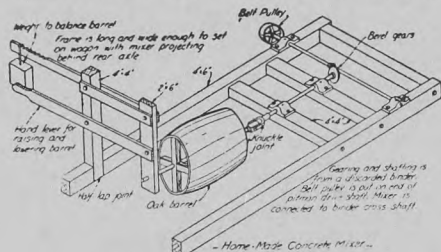
Bolts: For convenient removal and adjustment it is recommended that only machine bolts with washers on both sides be used. 39—¾"x4½"; 24—¾"x6"; 16—¼"x3½"; 6—¾"x2½" (for shoes). Lag Screws: 12—½"x5". Washers: ½ pound ¾".





## Cement Mixer

This home-made cement mixer is made from old binder gearing and shafting and a discarded gasoline drum. The main frame is made from 4x6's and is made to go on a wagon with the mixer projecting behind the rear axle. The hand lever raises and lowers the outer end of the drum for dumping and this makes it necessary to have a knuckle joint on the drive shaft, which works like a hinge. The belt pulley is put on the end of a pitman drive shaft and the drum on a binder cross shaft. The lever is weighted to balance the drum. This mixer has been in actual service and has given good satisfaction.

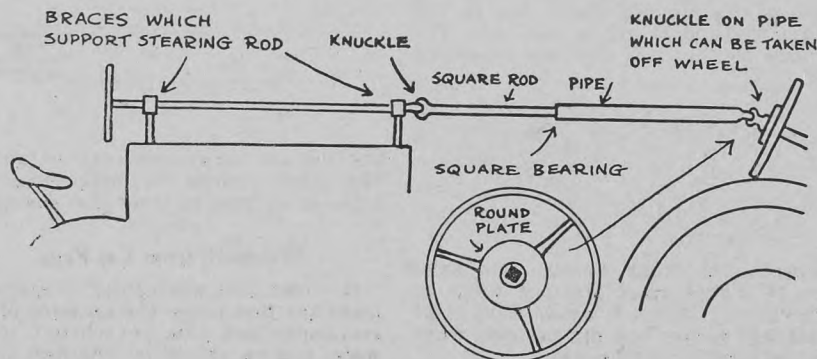


## Steering Tractor from Binder

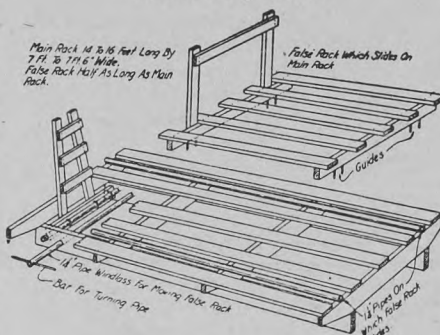
In the April issue, The Guide published an illustration showing A. J. Hiscock, of Lenswood, Man., driving his tractor from the seat of the binder. Mr. Hiscock was asked to give the details of construction and here they are, including a diagrammatic sketch:

Where the square rod engages a piece of pipe, there is a square bearing through which the rod will slip when turning corners. The inserted diagram shows how a round piece of flat iron is shaped to fit the steering wheel of the tractor so that it can be put on with clamps. A square piece of rod is fixed to the centre of the plate and it fits into the square hole of the knuckle. A cotter pin is used to hold it in place so that the pipe is easily detached from the tractor.

To work the clutch from the binder seat a rope is used. An extension is put on the foot clutch arm, the rope is attached to it and run through a pulley at the front of the tractor and then back to the binder seat. As Mr. Hiscock has a horse binder, the truck was taken off.



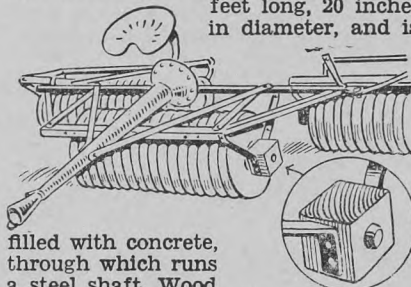
## Better Hay Racks



The diagram shows a false rack sliding on top of the main rack to save labor in using a hay loader. The false rack is loaded first simply by tramping the hay down as it comes from the loader. The loaded half rack is then pulled forward on the greased pipes by means of the windlass, and the rear half of the load put on the rack itself.

## Land Roller from Steel Culvert

This unusual farm land roller has proved unusually efficient. Made in three sections of ordinary steel, corrugated culvert, they are mounted to an old seeder frame. Each roller is five feet long, 20 inches in diameter, and is



filled with concrete, through which runs a steel shaft. Wood blocks, well oiled, form end bearings and to prevent these from rubbing against the ends of the concrete, old discs are placed between the concrete and blocks.

The tongue is the torque tube from an old car, bolted in place. The seat, once on a mower, is bolted to the axle housing end, a large iron ring provided in the other for attaching to the tractor or behind a team.—Dale Van Horn.

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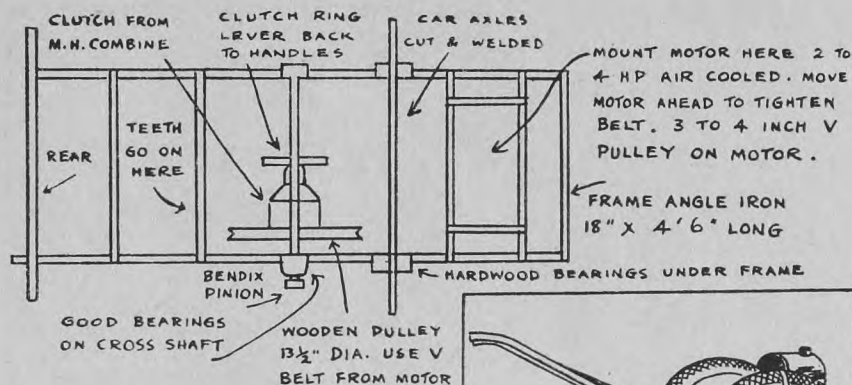
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### Power Garden Cultivator

In the February issue The Guide referred to a power garden cultivator constructed by R. A. Johnson, of Beadle, Sask. So many requests came to Mr. Johnson and The Guide for a detailed description of the cultivator that further information was supplied by Mr. Johnson. He says:

"It is not hard to build, with the help of a local blacksmith. Some welding and lathe work is needed. The chief difficulty at present is to get a suitable engine. We are using a Wisconsin air-cooled 2 to 4 h.p., depending on speed.

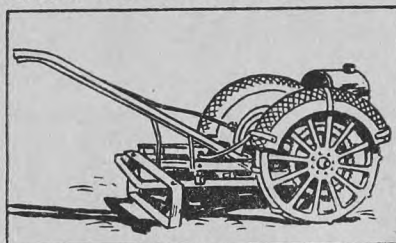
"The drive is taken by a V-belt from a 3 to 4-inch pulley on the engine to a 13 1/2-inch wooden pulley mounted on a counter shaft, along with the clutch from an old style Massey-Harris combine with the low grain tank. The lever from the clutch goes back over the handles to reach the operator.

"The counter shaft should be about an inch in diameter in good bearings. On the right-hand end, looking from the rear, is spot welded a Bendix starter pinion which is meshed with two ring gears from a model T Ford. These are mounted on the right-hand wheel, either by bolting to the spokes, or better still a steel plate is bolted to the hub where the brake drum goes.

"I am using model T wheels with lugs welded to the rims, and Ford axles cut and welded. Wooden bearings are all right on the main axle. No differential is needed; good long handles made from piping give the leverage to turn it easily. The frame is made of angle iron and the teeth from a spring tooth cultivator can be used; also blades made from car springs. I prefer the blades for getting all the weeds.

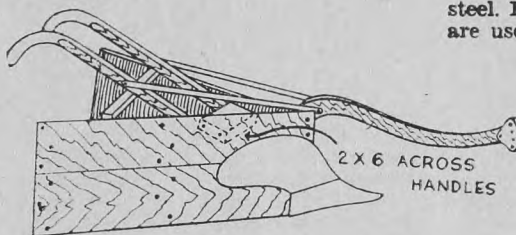
The teeth or blades should be set so they will cut outside the wheels. Made to cultivate a strip 22 to 30 inches is wide enough to handle and to cultivate. The mounting of the ring gear and starter pinion must be accurate and true. The only thing that wears is the small Bendix pinion and it is easily replaced.

"This cultivator is by no means a toy but is quite practical. We have had ours for four years and would not want to garden without it."



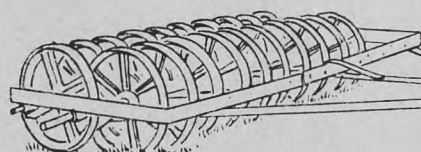
### Snow Plow or Ditcher

There are quite a number of walking plows scattered around the country. Even on the open prairie a few super-annuated breaking plows are left. This shows how a walking plow can be rigged up to make a snow plow or a shallow ditcher. On the level prairie a very shallow ditch will frequently drain the water away from buildings in wet seasons and avoid the accumulation of mud. A furrow soon fills in, but a wide shallow ditch will continue to function for a long time.



### Packer after One-Way

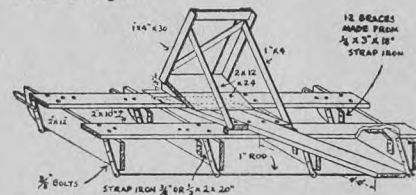
Last spring I bought a tractor and tiller combine but I decided I needed a packer behind it, so I got busy and made one. The frame is from an old drill with a through axle, with a second axle for the second row of wheels. Discarded plow wheels were used and they are spaced nine inches apart, ten in the front row and 11 in the back row. The wheels in the back row are spaced in



between the front wheels. The axles are 18 inches apart and the width of the frame is 8 feet 6 inches. This is an excellent packer and did not clog when pulled behind the One-way.

### Rod Weeder

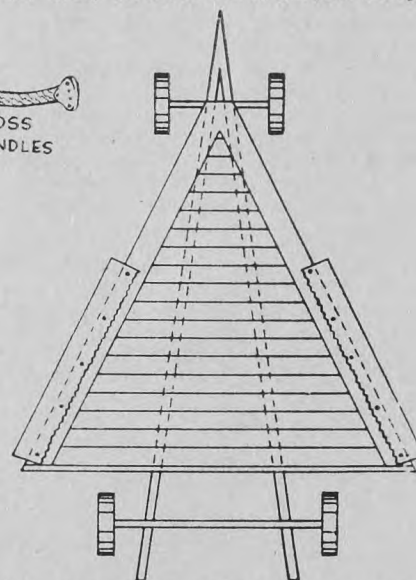
This rod weeder is easy and inexpensive to build. It consists of two round rods, one inch in diameter, attached to sled-like runners, one at the front and the other at the rear. When in operation only one rod is in the ground at a time. By shifting his weight back and forth the operator can put one or the other into the ground as he pleases. By this means it is possible to clear the rods of any accumulation of trash. When hitched to a tractor, this implement can be operated by one man, by the use of a tight cable attached to the front and rear of the implement and a 100-pound weight to slide back and forth with a rope.



### Homemade Corn Cutter

A wheeled type of corn cutter is shown here. The main frame is made of two 2x4's about eight feet long. They are set on edge and tapered together at the front. The platform is made of inch material. A 1x6 hardwood strip 4 ft. 8 ins. long is put at the rear and also 1x6 hardwood cutting V boards the same length at the sides.

The cutting blades are thin pieces of steel. In some places old cross cut saws are used, with the backs ground sharp,



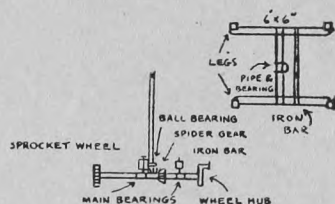
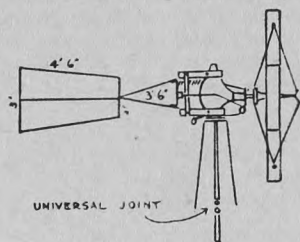
but they are not available on the prairie. The frame should be hung from the axles so as just to clear the ground.

### Windmill from Car Parts

It is said that when the first engineer made the first pump the ancestor of an economist told him he couldn't make water run up hill. When the first auto-



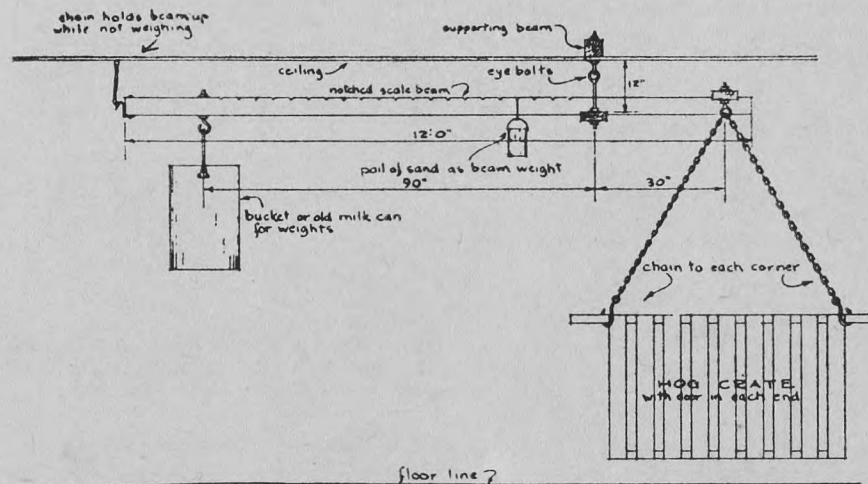
mobiles were designed no one guessed that used car parts would be put to so many uses. Now some farmers are making use of them to work the farm pump.



R. I. Thomas, of Stettler, Alta., has made a new wind motor out of an old motor car. The illustration is from his drawings.

### Homemade Hog Scale

This is a home-made hog-weighing scale designed by officials of the Alberta department of agriculture. The measurements are given in the sketch. The beam is a 12-ft. 2x4 and it has 29 notches three inches apart. Each notch represents one pound. The beam weight, contents and container combined, should weigh 10 pounds. Use dry sand and keep it dry. If the pail is filled, solder on the lid. The bucket or old milk can should balance the hog crate when the beam weight is removed. For extra weights to use in this bucket make three 20-pound weights and one 10-pound weight from cement run into a stove-pipe and chip when dry to the exact weight. Rocks of the proper weight are satisfactory.



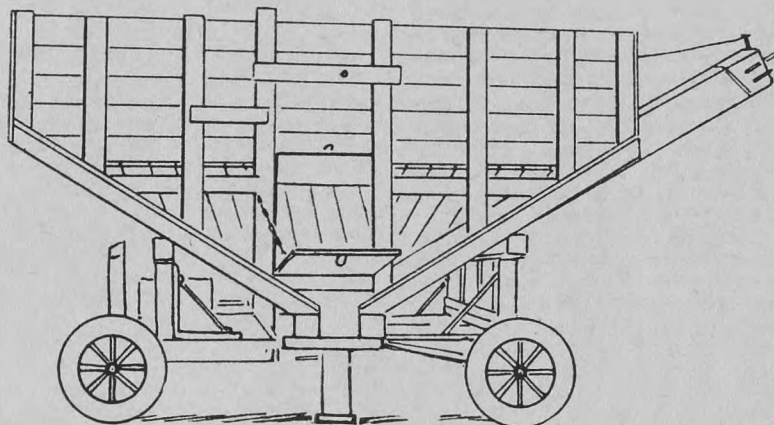
• SIDE VIEW

To operate, check the balance of the scale with beam weight removed. Replace the beam weight, drive or otherwise induce the hog into the crate and add 60 pounds to the bucket. This will balance a 180-pound hog. Move beam weight outward until balance is obtained. The number of notches added to 180 pounds gives the approximate weight of the hog.

This scale is for private use only. In transactions with the public it would not stand in a court of law. The Weights and Measures Branch of the Dominion government would have something to say about that.

### Hopper Mounted on Ford Chassis

This sketch is from a photograph of a grain hopper built by Geo. Halpenny, Strathclair, Man. It is mounted on a model T chassis. The hopper is 12 feet



long and 6½ feet deep. It has two cross sills of 6x6, at the bottom and beneath them two pieces of 6x6 hinged to cross pieces with pieces of planking on them to take a wider bearing on the ground. You draw the hopper a foot or so farther forward than it will sit and then back it up until these two supports are

upright, so that they will take the weight of the load off the chassis. Two other cross sills are placed part way up the slope to keep the hopper in place.

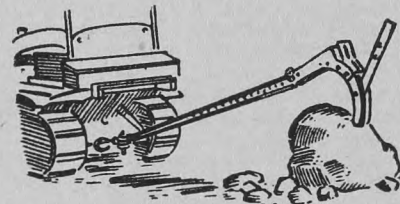
The engine is left in its original position and is attached to the auger of the elevator by two universal joints. The auger is nine inches in diameter and 14 feet long, and is out of the annex of an old elevator. It is in a square box or spout, in the lower two corners of which are pieces of 2x2 ripped from corner to corner to help hold the grain up to the auger. On the side of the hopper is a door which lets down so that grain can be shovelled out of a bin or granary and elevated into a truck. The frame is of 2x4's lined with shiplap. An iron rod across near the top keeps the hopper from spreading.

A similar assembly made a year ago will elevate 125 bushels into a truck in

five minutes, Mr. Halpenny informed The Guide.

### Stone Puller from Plow Beam

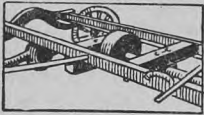
Mr. E. J. Stansfield, Atwater, Sask., has furnished The Guide with a snapshot of a stone puller taken on his



farm from which this drawing has been made. It is an old idea to him, but may be new to many. It is made from an old P and O plow beam and the assembly is left just as it was on the plow after the share, mouldboard and frog are removed. The clevis is arranged so that the rock puller remains vertical. The puller is strong enough to take all you can give it, but a man can handle it. It can be attached to any tractor. Mr. Stansfield never tried it with horses, but he knows some men who have used it successfully with them.

### Model-T Power Plant

To make a power plant out of an old Model-T with the least possible change do this to it: Strip it down to the chassis, fit a pulley on the drive shaft between the two cross members as shown in the cut. Disconnect the shaft from the differential and remove the housing. Make up the cross members out of 4x6 or 6x6 hardwood, and bolt them in place, one about 3½ feet ahead of the rear axle and the other a couple of feet ahead of that. Short pieces of 4x4 in which holes have been bored are bolted under the cross members to form bearings. Sawing off the unused portion of the drive shaft completes the job.



### Stationary Power Plant

Old Ford engines are widely used for providing stationary power. The illustration shows how the assembly may be made. It can be mounted on the original chassis with the radiator and fan belt in place to give better cooling. The clutch unit should be left in place to facilitate starting and changing speeds. A governor should be provided in case of variable load. Thus a cordwood saw with the throttle opened wide enough to cut through the log, without a governor, the engine would run away when the log was cut off and might easily burst the saw or balance wheel and perhaps kill the operator. A simple and effective governor can be secured, at a reasonable price, ready to attach. For extra cooling a common way of adding an extra barrel of water supply is to cut the hose connections leading from the engine to the radiator and insert a tee of the proper size and from the side opening of the tee connect pipes or hose connections to a barrel set close beside the engine. Some solder a hose connection to the radiator cap and connect to near the top of the barrel and then plug the radiator overflow, with the barrel placed as high or higher than the radiator.

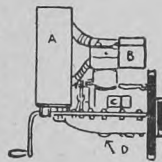
Most four-cylinder auto engines will not run smoothly below 800 r.p.m., which

usually means a road speed of 20 miles per hour, and at this speed will not have more than one-third to one-half their maximum power. Hence it will be necessary to figure the pulley sizes for an engine speed of 1,000 r.p.m., which means a road speed of 25 m.p.h. and means only a partially opened throttle. This would make an eight-inch pulley about the best diameter, which at 800 r.p.m. would give a belt speed of 1,700 f.p.m., slow enough for most slow machines; at 1,000 r.p.m. about 2,100 f.p.m.; at 1,200 r.p.m. about 2,600 f.p.m., about right for most gas engine driven machines and at 1,500 r.p.m. about 3,200 f.p.m., which should care for the great majority of farm machines. For real slow machines like a grindstone or cement mixer, the transmission could be changed into second or even low. The operator should own a speed indicator and know how to use it, and see that his machinery is run at the proper speed.

### One Cylinder Power Plant

This is the way I made an old model T engine into a one-cylinder power plant for use in the workshop. It runs anything that requires up to two horse power.

A is the water tank; B the gas tank, C the coil and D the oil tap. The head and water jacket, where it is cut off, can be soldered and welded. Use a long hacksaw for cutting the block. Cut

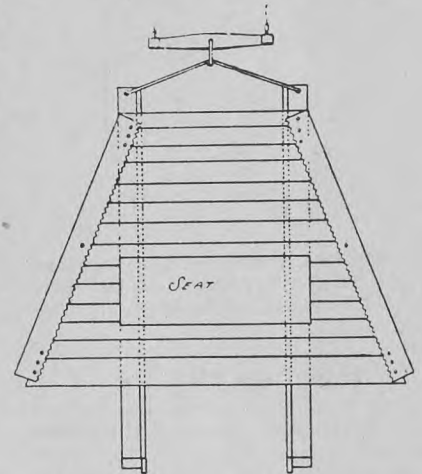


No. 2 cylinder off high enough so the head of an old piston can be put in the hole to keep the oil from flying out. Cut off the piece of crank shaft back of the centre bearing to bolt the flywheel on. Magnets and everything are removed from the flywheel and a belt pulley put on. Use the same timer and one coil. To fasten on the carburetor use a piece of straight pipe about six inches long for a manifold. Drill a hole in the water jacket on the block for lower water connection and use radiator or tank for cooling. Use battery ignition.—E. D. Luther, Cardston, Alta.

### Simple Two-Row Corn Cutter

Many farmers do not have a corn binder available, and some kind of a two-row cutter is a wonderful improvement over the old-fashioned hand method of cutting.

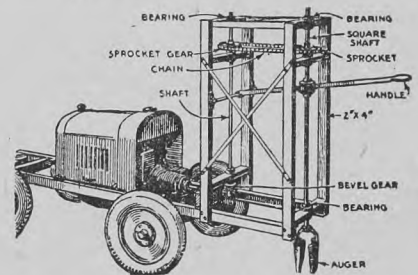
The diagram below shows a home-made sled type of two-row cutter. The runners are 2x6's six feet long laid flatwise 28 inches centre to centre with inch boards nailed on the inside and projecting one inch to act as guides.



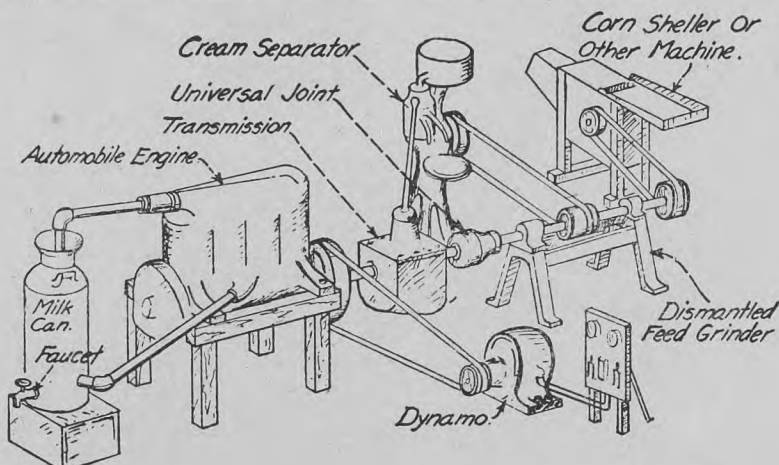
These are covered with inch boards for a platform. The cutting knives are made from thin pieces of steel with the outside ground to a sharp edge. The front end of knife edges should be 31 inches apart and the rear ends 66 inches. The knives should be at least four feet long.

### Power Post Hole Digger

This power post hole digger can be rigged up from parts salvaged from discarded farm machinery. The bevel gears and top sprockets are from an old grain binder. Bearings in which the square shaft turns are of the type used on grain drills, or boxings and spools from a disc harrow can be used. The square shaft must extend out of the top bearing from three to four feet when the auger is in



a raised position, the exact amount depending on the depth post holes desired. The size of the framework can be varied according to the material at hand. A power driven digger, such as this, is not only a handy thing to have around "the







## SECTION 2.

## Trailers, Wagons, Sleighs

## Modern Two-Wheel Auto Trailer

(With frame extension suitable for house trailer)

This trailer may be constructed from a standard front axle, springs, and converted auto frame. It may be built to take the same wheels as your car—car wheels and trailer wheels are then inter-changeable.

## Axle Assembly

The standard fixtures of a front axle are left complete. In order to provide rigidity, the wheels are set in the proper position and held by bolting a piece of heavy strap iron to the end of the steering rod and to the axle.

This is claimed to be a superior arrangement to that of welding the spindles to the axle, for, in the latter case, a slight parking lot accident might break the weld or bend the axle; whereas, in the former, the steering rod only would bend and it could be easily straightened or readjusted.

## Wheel Assembly

Hubs are selected to fit the spindles. If, as in this case, the desired wheels have the attaching bolts spaced in a large diameter, it will be necessary to bolt a large drum to the hub and then drill holes in the proper position in the drum and bolt the wheels to the drum. The holes must, of course, be centered with calipers in exactly the right position or the wheel will act as an eccentric.

If the desired wheels have the attaching bolts arranged in a small diameter, it might be possible to bolt the wheels directly to the hub.

## Frame Assembly

The frame is a converted auto frame arranged and bolted in a V-shape. By selecting similar frame material in a slightly smaller size, and bolting it inside this frame, its length may be conveniently extended and the wheels moved further back. The vehicle would then be suitable for a house trailer.

In making trailer frames always be sure they are V-shaped. Square or oblong frames result in excessive road sway and excessive strain at corners of the frame.

## Springs

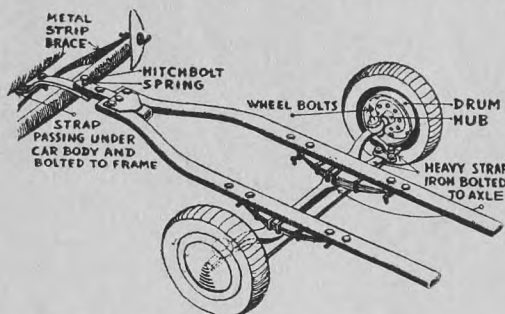
The springs are bolted to the frame in the usual fashion which permits swinging at both ends.

## Hitch Assembly

The hitch needs little explanation for the illustration is self-explanatory. The piece of heavy strap iron shown is bolted directly to the car frame and braced with light metal strips to the bumper. The hitch-bolt is of extra hard steel. The spring on the hitch-bolt is to keep both sections of the hitch on contact and prevent rattling. A suitable gadget is bolted inside the frame to keep the hitch-bolt in a vertical position.

## Box Assembly

Plans for the box are unnecessary as each builder will have his own ideas. Three or four 2x4's should be bolted to

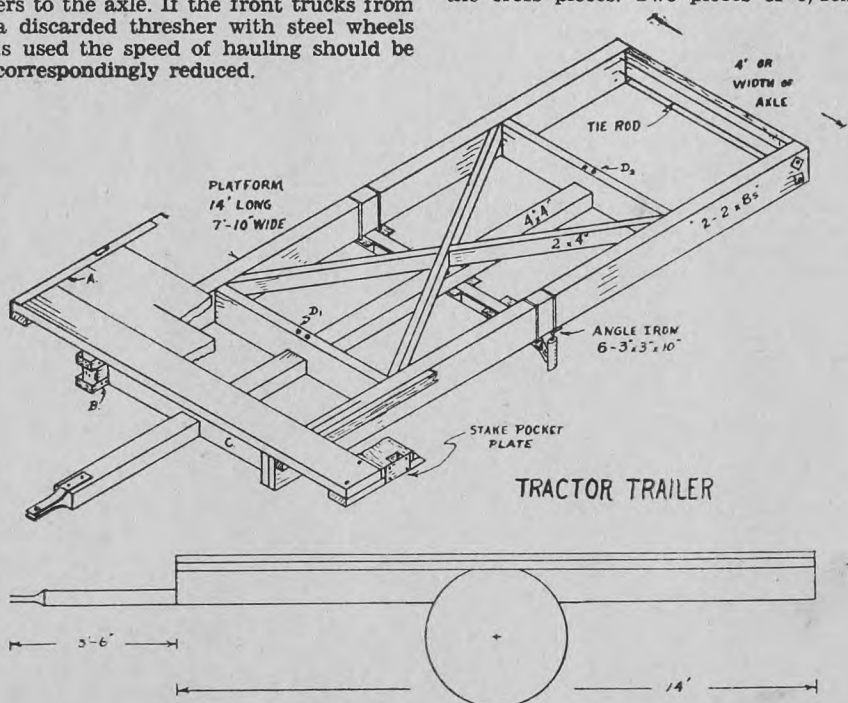


the frame parallel to the axle, and the boards forming the floor of the box should run at right angles to the axle.

## A Tractor Trailer for Heavy Farm and Road Work

The tractor trailer illustrated in the accompanying drawing is designed to carry a ton and one-half load and a minimum of steel is used in its construction.

A front axle from a 1½ or two-ton truck can be utilized. If a truck front axle is not available a rear axle can be used with some variations in construction. In this case blocking must be used between the axle and the frame to give wheel clearance and the body frame may have to be narrower to utilize the spring saddles when bolting the stringers to the axle. If the front trucks from a discarded thresher with steel wheels is used the speed of hauling should be correspondingly reduced.



Where a truck front axle is used, the axle should be inverted and bent cold to give the wheels a camber of about one degree. This bend should make the wheels about one-half inch closer together at the bottom than at the top. Six pieces of three-inch angle iron are welded to the axle for mounting the body.

In cases where automobile or truck axles are used, 32x6 heavy duty high pressure truck tires are recommended for a two-ton load. Other sizes of tires may be used with corresponding loads.

The side members of the frame may be made from two pieces of 8-inch channel iron 14 feet long or from two pieces of 4x8-inch clear fir. The cross pieces may be made of 2x8-inch pieces of lumber and the unit bound together with two half-inch rods at each cross bar.

The frame should be made as wide as possible to carry the load close to the wheels.

The frame may be braced with pieces of two by four which are attached to the frame with light bolts.

The axle may be attached to the frame with four half-inch "U" bolts which are notched into the top of the frame members so the platform can be placed on a level surface. Keep in mind that the trailer must be strong to be useful.

The pole should be made from a sturdy piece of 4x4, (hardwood preferred) and rigidly fastened to the axle so the draw goes directly to the wheels. The pole piece can be bolted to each cross member at D1 and D2 or attached by a narrow iron plate fastened below the cross pieces. Two pieces of 5/16x-



3 1/4 x 14-inch plate may be used for the hitch. A piece of three-inch pipe or a piece of channel iron may also be used as a pole. Two-inch plank, seven feet ten inches long may be used to build the platform.

If angle iron is available it may be placed along the edge of the platform so that stake pockets can be installed. Where this is not available stake pocket iron plates can be placed on the side of the platform and attached with lag screws. If desired, the platform can be made slightly narrower and a 2x4 can be bolted along each side to make a plate for the stake pockets.

Notice that the front cross member of the frame (C) has been placed four inches back to allow for stake pocket bands on the front of the trailer. The rear end may be constructed in a similar fashion.

The platform may be spiked to the frame members but a better fastening can be obtained by bolting a piece of 2x2 along the outside edge of the frame beams. Bolts from the platform can be run through this rib.

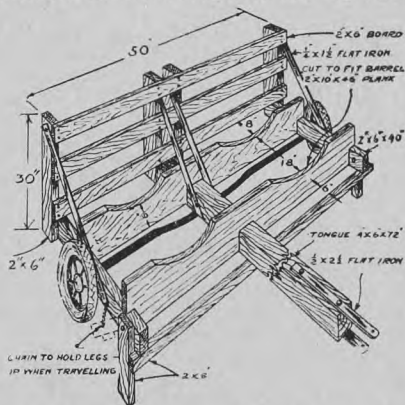
Where brakes are required for highway hauling the master brake cylinder can be attached to the front frame cross member and operated from a lever conveniently located for the tractor driver.—W. Kalbfleisch.

### Fuel and Water Tender for Tractor

This tender is constructed mainly of ordinary dimension lumber, plus an old automobile front wheel assembly and a few simple parts made from flat iron. The dimensions of the tender and sizes of lumber are shown in the sketch. The special features are:

1. Ease of loading.
2. Convenient transportation.
3. Choice of pump or tap to supply fuel or water to the tractor.

When the tender is tipped up so that the back rests on the ground, full barrels can be loaded without much lifting, or empty barrels are easily removed. In this same position, fuel or water can be pumped direct to the tractor with the tractor standing close to the barrels. The tender is tilted to a horizontal position for travelling and the leg rests



are held off the ground by means of a hook and chain. The tender is also placed in the horizontal position with

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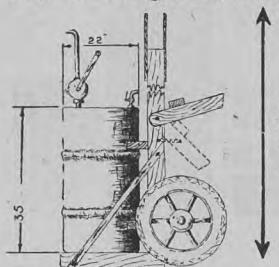


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the leg rests on the ground when the fuel or water is taken from the barrel through a tap.

In order to make tilting of the full barrels as easy as possible, the wheels are fastened close to the back of the machine. The wheels should be two inches off the ground when the tender



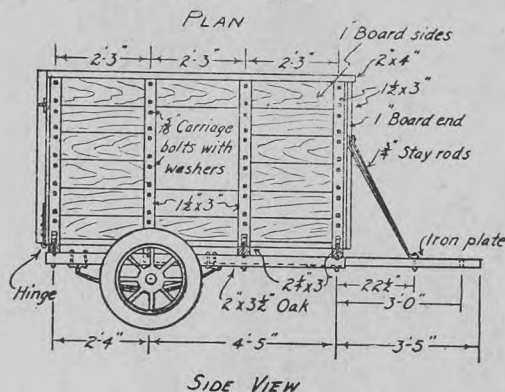
WHEEL 2" OFF GROUND  
LOADING POSITION ALSO CORRECT POSITION  
WHEN PUMPS ARE USED INSTEAD OF TAP

Position when travelling — also correct position when using tap instead of pump.

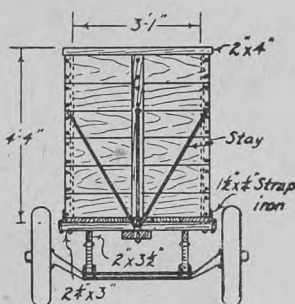
is resting on the back, as shown in the sketch. To view the tender in a horizontal position, turn the illustration shown here on its side.

### Livestock Trailer

Prof. L. G. Heimpel, of Macdonald College, Que., designed this livestock trailer and the illustrations are from



SIDE VIEW



FRONT VIEW

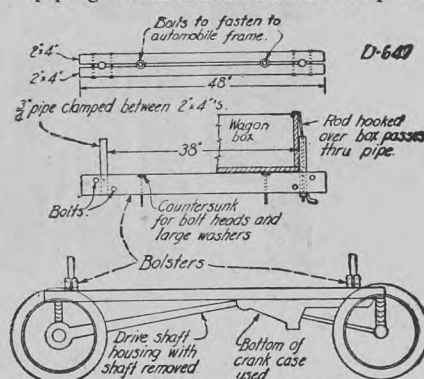
drawings by his department. The measurements are all given and little descriptive matter is necessary. The sills are 2x3 1/2 oak, but clean, straight grained fir 4x4s could be used. Balance in a two-wheeled trailer is important and it is ensured by faithfully following the drawings in making the measurements. The rear end is hinged at the bottom. Side and front views are given.

### Handy Trailer Indicator

The usual low two-wheeled trailer does not show in the rear view mirror through the back window, and the driver can tell only by the feel of the car if the trailer is following properly. A simple remedy for this is to tack a lath upright on the front or rear end of the trailer box so it will show at the middle of the rear window. Then an occasional glance in the rear view mirror shows if the trailer is trailing properly and the stick does not interfere with the view of the road behind.—I.W.D.

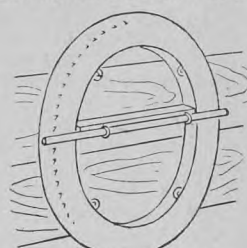
### Trailer from Ford Chassis

The bolsters of this trailer are made from 2x4s bolted together in such a way that they clamp tightly on pieces of piping which function as bolster pins.



A rod comes up through the pipe and hooks over the top of the wagon box. The heads of the bolts which fasten the bolsters to the frame are countersunk. Notice that the bolts which hold the 2x4s together are staggered, the outside ones being near the top and the inside ones near the bottom to help hold the bolster pins plumb.—I.W.D.

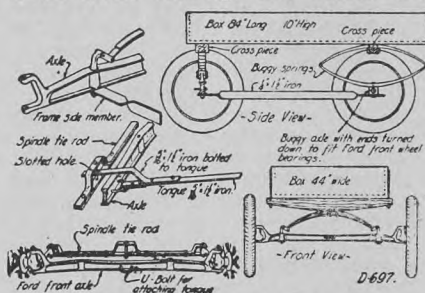
outside of the box. Eye bolts are turned into this 2x4, the tire hung in place then a short length of pipe pushed through the eye bolts (screw eyes) to lock the tire in place. For larger tires, the thickness of the bolted member will have to



be correspondingly wider. In any case its width should be such that the pipe makes a snug pinch fit against the tire. This holds it in place and prevents it from working out of the screw eyes.

### Trailer or Buggy

Here is an old auto chassis rebuilt into a trailer or buggy. The side view shows it with a box 84 inches long and 10 inches high. The hind axle is an old buggy axle turned down to fit Ford front wheel bearings. Buggy springs are also used on the rear axle. There are two reaches connecting the rear and front axles, made of flat iron, 1/4 by 1 1/2 inches, and given a half turn at both ends. A detail of it is given in the upper left corner of the drawing. The front view shows that the box is 44 inches wide and that the front assembly of the running gear of the car is used, including the spring. Therefore two sets of front wheel bearings and wheels are



### A Light Handsleigh

This is for the children. It takes two bows from a buggy top for runners. I



used car bows for all the frame, but 1 1/2-inch lumber will do. Use buggy tires for shoes, scrap iron for braces, two harness rings to take the rope and 1/2-inch lumber for the seat. The inside braces for the runners can be made from 18-inch pieces of buggy tire bent to suit and fastened on with screw nails to give the runners the proper angle of spread.

### Mounting the Trailer Spare Tire

The accompanying sketch shows a simple way to mount the spare tire for the farm trailer of the wagon box type. This carrier is nothing more than a 2x4 a little less than the net inside diameter of the tire rim, bolted on edge to the

used as the rear assembly is made from front wheels and bearings. The front axle is shown at the lower left. A U-bolt inserted in the axle takes the tongue. A piece of flat iron, suitably bent, is bolted to the tongue and passes over the axle to the spindle tie rod. A piece of flat iron, bent saddle fashion, takes this iron, which has a slotted hole to engage the bolt and allow for play. Both the tongue and the iron fastened to it are of 5/16 iron, 1 1/2 inches wide.

The same assembly could be made the basis of a horse-drawn buggy. It would need a different box, with suitable seating arrangements, and the tongue would be made to use with horses. Otherwise the general construction would be the same. A little ingenuity would make it suitable for one horse and a pair of shafts. Instead of one iron bolted to the tongue and connecting with the spindle tie rod, two could be made, one for each shaft.



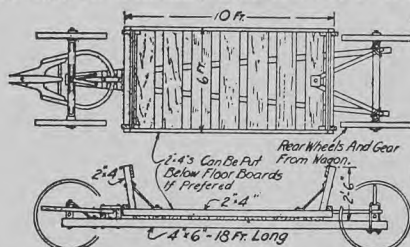
### Steering Device for Trailer

The accompanying drawing shows a drawbar and steering device for either a trailer hitch for a four-wheeled trailer made from an old automobile or for a horse-hitch for a similar vehicle. Steering is accomplished through an extension of the main drawbar to the rear of the axle which is coupled to a shortened drag link (A) made from a part of the original steering mechanism of the Model T Ford car. The drawbar itself is made of extra heavy wrought iron and it is important that this part of the hitch be made of the weight of material specified to prevent it from bending under the heavy load it will have to bear. A one-piece pillow block bearing makes the best type of anchorage for such a hitch and lock nuts should be used on the main draw bolt passing through this bearing. It is important that the trailer tongue is free to move up and down though it must always be possible to keep it tight so that steering of the trailer will be controlled. The large bearing surface of the flat plate on either side of the front end of the hitch where it is coupled to the rear end of the trailer tongue provides the necessary bearing surface to prevent looseness at this joint.

The greatest difficulty usually met with in the use of four-wheeled trailers is the tendency for these vehicles to weave badly when following a car. This is due usually to the destruction or maladjustment of the caster action of the front axle. Any garage man will know how this should be adjusted, but in any car with transverse springs, such as has been employed in practically all old models of Ford cars, it is important that the radius rods be kept in good condition and properly coupled to some reliable anchorage on the underside of the trailer chassis. Too much caster action in the front axle is likely to result in a wheel wobble closely associated with a "shimmy" while too little caster action causes weaving of the vehicle or the destruction of the natural steering qualities of the vehicle. Overloading of trailers or wagons is likely to disturb the set of the springs and destroy the caster action. For this reason farm wagons made from old automobiles had best be rebuilt so as to remove the springs altogether.—L. G. Heimpel.

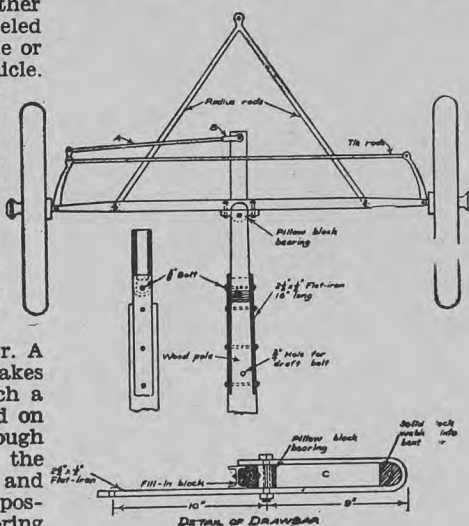
### For Handling Bundle Corn

One of the greatest labor-saving devices in handling bundle corn is the



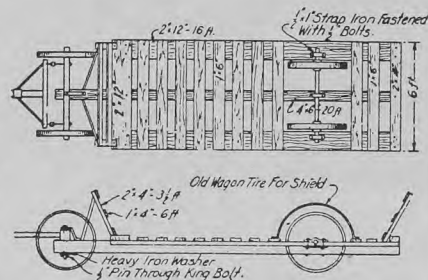
(Short Underslung Silage Wagon)

low-down rack. The short type is the most easily constructed and the most



common, and will hold plenty of a load where the distance is not too great. The sills are 4x6's 18 feet long swung underneath the rear axle by means of heavy clamps, the rear reach being bolted on top of the back cross board of the platform. The sills are brought together and bevelled at the front and bolted together.

The regular kingpin on which the front axle pivots is removed and replaced with a longer one, which is



(Long Silage Wagon.)

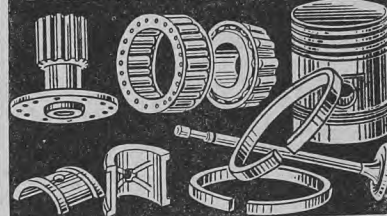
either threaded at lower end and nut, and lock nut put on below the 4x6's, or else is bored with a three-eighths inch hole and heavy washer and machine bolt put on below.

The long type is not quite so common or so easily made, but has a much greater capacity. It can be built in much the same way as the other type by swinging the timbers under the rear axle of an ordinary wagon, or, as shown in the cut, is made from two mower wheels mounted on the old mower axle or piece of gas pipe of the proper size for an axle. This is clamped to the top of the timbers by clamps made of old wagon tires fastened with half-inch bolts. Guards to go over the rear wheels are made of the same kind of material. The front wheels shown are from a low truck wagon, or the front wheels of an ordinary wagon can be used if preferred. The same arrangement of king-bolt is used as shown for the short type.

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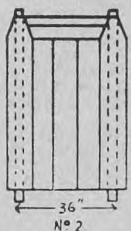
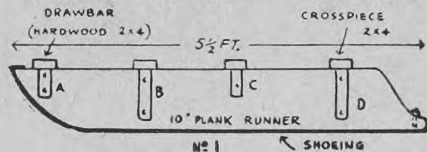
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## Serviceable Jumper

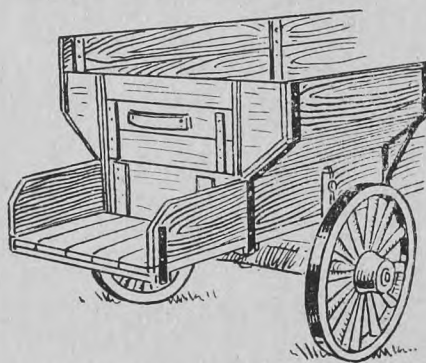
The runners are made from 2x10 about 5½ feet long. The cross pieces, B, C and D, are 2x4 securely fastened by means of brackets shown at Fig. 3, though perhaps two sets of inner braces will be enough. The drawbar A is hardwood fastened near the front with two of the outside brackets. The shoeing may be made of old buggy tires. I fastened my shoeing on with 1½-inch screws, with a bolt at the rear as shown. Sketch 2 shows the completed gear with floor built over the cross pieces. Building the floor this way makes the outfit stronger and also leaves a convenient step on the outside. For our own rig I used the rear half of a model T touring body, cutting the tin at an angle about a foot ahead of the back doors, and fitting a dash high enough to



keep out most of the flying snow. The tongue of the truck wagon can be used during the winter and replaced in the spring again.

## Extended Wagon Facilitates Scooping

The design of this wagon box has two distinct advantages. By sloping the box outward, about 30 per cent bigger load is possible and by extending the bed

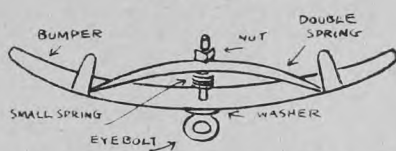


itself past the endgate, no grain is lost with those first few scoopful when unloading. Angle iron forms the reinforcing at the ends of the endgates, strap iron binds the rest of the box together.

## How To Store Canvas

If mice destroy your binder canvases when not in use, try storing them this way. Suspend two barrel hoops from the ceiling of the machine shed and lay the canvases in the hoops. This will protect your canvases.

## Trailer Hitch



This is the best trailer hitch that I have used. Take two old car springs, one longer than the other by 8 inches and wide enough to fit snug into the groove in the bumper of your car. Make an eye-bolt about 6 inches long and drill holes through the middle of the bumper and the old car springs. In between the bumper and the springs put a coil spring. An eye-bolt goes through the holes as shown, with a washer between the eye and the bumper. Any one using this kind of a hitch will hardly know they have a trailer behind the car.—Ken Nelles, R.R.2., Wetaskwin, Alta.

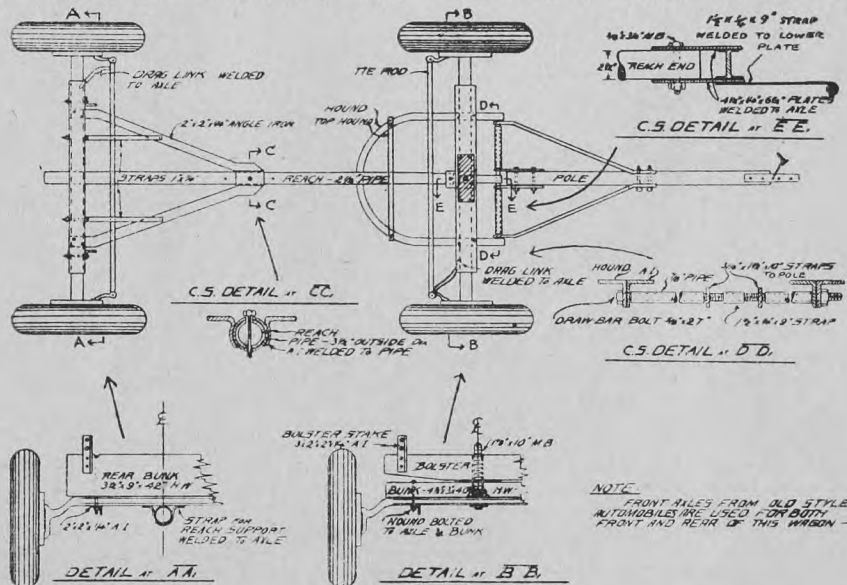
## Wagon Frame from Auto Chassis

Although every other farmer has made some kind of a wagon from an old car, there is always something new and better. The wagon illustrated is an all-steel construction job which has been designed to trail well at high speed and to back up with a heavy load easily. This feature is obtained by having the complete front trucks turn like a wagon and not like the wheels of an automobile.

Two front axles and wheels from wrecked cars, some scrap angle iron, seven feet of old two-inch pipe, and some pieces of strap iron are the main parts needed for the wagon. By varying the construction according to the scrap iron laying around the yard, the wagon can easily be built for twenty-five dollars even though much of the iron is purchased.—W. Kalbfleisch.

## Construction of the Rear Wheels

When obtaining car axles and wheels for the wagon, you should endeavor to



obtain wheels which will take the common size of tires so the tires can be readily purchased second hand. The axles of the car can be laid down in their natural position for a low wagon or can be turned up to give good clearance. When left low as in a car, however, the wagon can not be made to turn sharp unless a narrow box is used.

The rear hounds are attached to the axle by two bolts placed in two of the holes formerly used by the spring clips. The other two holes are used to bolt the rear bunk to the axle.

A flat plate welded to the top of the axle, or a plate clamped on to the axle makes an excellent flat bed for the bunk. In order to obtain sharp turning, the rear bunk is made to be just about as high as the wheels. At the front end the rear hounds are welded or bolted to a short piece of pipe which will easily slip over the reach pipe. This pipe has a large hole in it for the reach pin, so the rear trucks will be free to move over rough ground. Angle iron can be bent by sawing a "V" out of the flange and then joining the iron by electric welding. The bend can also be made by heating the angle in a forge and holding it in a heavy vise while giving the iron a twist.

## Construction of the Front Trucks

The half circle hound can be formed by giving the angle iron a series of short bends when red hot. The top hound is a straight piece of angle iron placed above the reach pipe and spaced by two short pieces of pipe about two and a quarter inches long.

The plates used to connect the front end of the pipe reach can be formed by putting a "U" shaped piece of heavy flat iron around the axle. This eliminates a welding job and is possible because the central strap to the cross rod for the pole has been found to be unnecessary. A heavy bolt (at least ¾-inch) should be used in the front end of the reach because of wear on the bolt due to turning.

The king bolt must be placed in the

NOTE: FRONT AXLES FROM OLD STYLE AUTOMOBILES ARE USED ON BODY. FRONT AND REAR OF THIS WAGON.

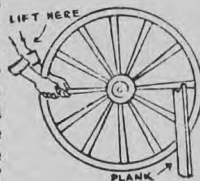


lower bunk with its head down as illustrated, and set in place before the lower bunk is bolted to the axle. Since the lower bunk is not heavy, the king bolt can not do much work and therefore I advise you to put cleats on the wagon box alongside of the rear bunk stakes and omit them on the front.

Once you have a sturdy rubber-tired wagon to go behind horses or a rubber-tired tractor, you will consider it the handiest piece of equipment on the farm.

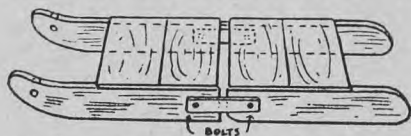
### Greasing Wagon Wheel

It is quite difficult to grease a heavy wagon alone. Here is a suggestion that makes it easier. Cut a notch in an 18-inch piece of 2x4 and place it on the inside of the wheel against one of the spokes. Lift upward on the opposite side of the wheel and it will slip out quite easily. The process may be reversed for replacing the wheel.—A. Proberg, Mildred, Sask.



### Jointed Jumper

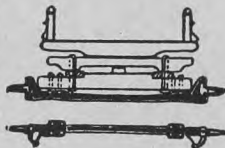
By simply cutting the runners of a jumper in the middle and fastening them together by two stout pieces of



flat iron each with two bolts, you have made it easier for it to run over rough or uneven ground. The bolts are not drawn too tightly so that there is freedom of action. It makes a smoother running rig in every particular.—W.S.A., Rockyford, Alta.

### Speeding Up the Farm Wagon

Attaching old auto axles to a farm wagon converts it into a rubber tired car trailer or wagon. From an auto junk yard obtain two front



axles of the type shown in the cut. Saw off the skeins on the front wagon axle and fasten the car axle in place with heavy bolts. Give the rear axle the same treatment. Nothing is removed from the wagon but the skeins.

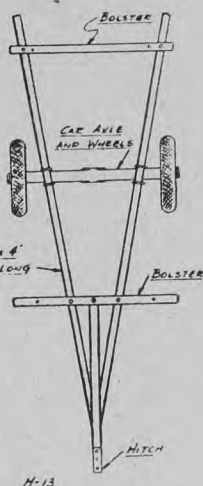
### Fumes and Trailer

The carbon monoxide from the car exhaust sometimes kills animals hauled in trailers, and owners will do well to slip an extension over the exhaust pipe and fasten it to the bumper so as to throw the fumes out at the side, or better to put a piece of conductor pipe along the trailer frame and connect it loosely to the exhaust pipe with a flexible hose, so as to carry the fumes back of the trailer.

### Heavy Two-wheel Trailer

A subscriber recently asked for plans and directions for building a two-wheel trailer capable of hauling three-fourths of a ton of hay. We built such a trailer and we find it very useful even behind a car, as it will not whip from side to side at high speeds.

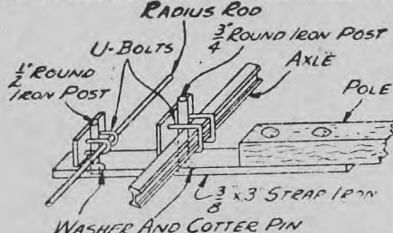
The materials needed are the rear axle and wheels from an old car, two 14-foot 4x4's, two bolsters from an old wagon, a 4x4 about 8 feet long for a hitch, and a few bolts and clamps to hold it together. We took the springs off and clamped the timbers directly on the rear axle so as to make it lower and to avoid pitching and swaying. The axle is put about 14 inches back of the middle of the long timber so as to put part of the load weight on the rear wheels of the car to increase traction. The 14-foot timbers are tapered to fit on each side of hitch 4x4, and the front bolster is also fastened rigidly to the rear end of the hitch timber as well as to the 14-foot stringers. Any heavy trailer hitch can be used, provided the connection is secure and the pull is thrown on the car frame rather than on the bumper. We use either a 14-foot hay rack or a regular wagon box, and the trailer is strong enough easily to hold 50 to 60 bushels of wheat.—I.W.D.



HEAVY TWO-WHEEL TRAILER

### Auto Trailer Hitch

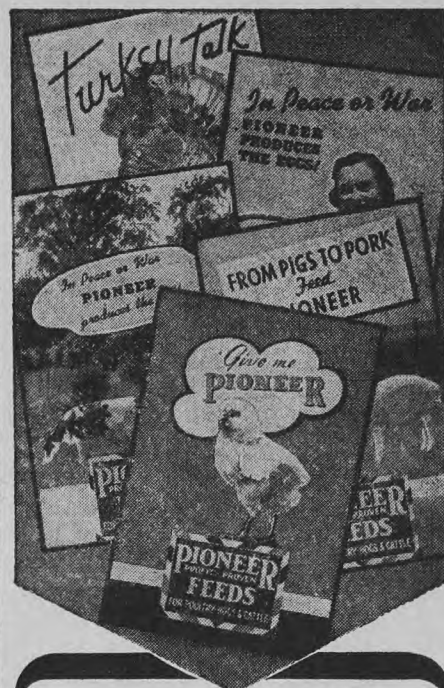
The diagram fully explains a simple and convenient trailer hitch which can



be used for any four-wheel trailer or for trailing an auto behind a truck or another auto.—I.W.D.

### Barrel Barrow

I attached two disused plow handles to an old plow wheel using a 16-inch hardwood axle. I reinforced the ends of the handles with heavy-gauge sheet iron nailed firmly over the ends. I bolted cleats on side of barrel to help carry the weight when the barrel is heavily loaded. When there are a great number of pigs to feed it is a great help.



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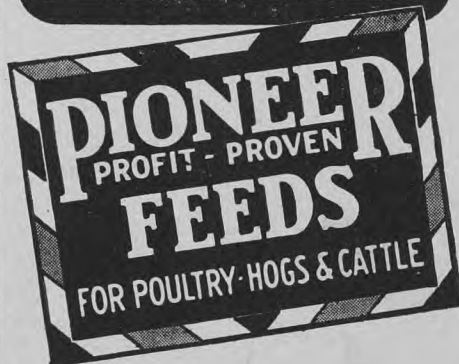
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### SECTION 3.

# Derricks, Hoists, Presses

## Braced Boom Hay Derrick

**T**HIS stacker, from plans put out by the Lethbridge Experimental Farm, takes considerable construction and building one should not be left till haying time approaches. It possesses a number of advantages not found in other types. It is easily skidded from one location to another and since guy wires are not necessary, it is ready to be put to work at once. Either slings or hay fork can be used. Care should be taken not to overload the slings unless the

stacker has been sturdily constructed.

The following suggestions will be helpful in building the stacker: Metal parts found in salvage heaps, and discarded telephone poles can be used in the construction, but good quality poles should be obtained for the mast and boom. The mast should be at least 26 feet long and is placed with the large end up. The braces running from the mast to the boom should be attached to the mast at the surface of the platform and not above it. This construction is necessary because the portion of the mast between the platform and the point of attachment of the cross braces must support all the weight exerted on the stacker. It follows that the greater

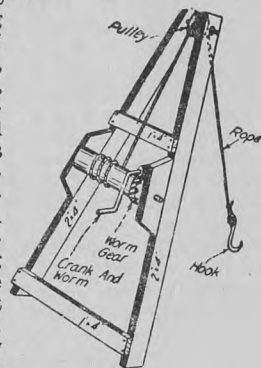
the length of this section the more likelihood there will be of breaks occurring.

The boom is a 35-foot pole with a diameter of at least five inches at the small end. The base may be constructed of poles or squared timbers. It should not be any smaller than the dimensions shown on the attached plan as a smaller base might lack weight and so allow the stacker to upset. For the hoisting cable a 5/16 or a 3/8-inch flexible wire cable is desirable but a 1/2-inch rope may be used. Heavy duty pulleys should be used throughout as it has been found that cheap, light weight pulleys will not last for more than one season.

hook from the pulley at the top then down and around the wheel hub and fasten to a spoke. A piece of 2x4 or other stick will hold the wheel from turning. This hoist can also be used for lifting an engine out of a tractor or an automobile, or in changing a tractor wheel. One man can exert all the force a 7/8-inch rope will stand.—I.W.D.

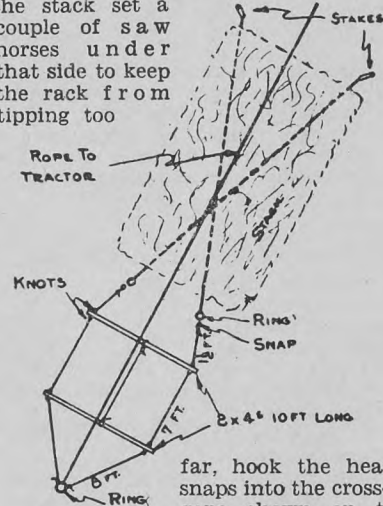
## Samson Hoist

Equipment for lifting barrels of fuel, beams, heavy boxes, tractor engines and heavy weights becomes increasingly important. A handy portable lifting device is the Samson hoist shown here. It is mostly built of wood.



## Roll-up Stacker

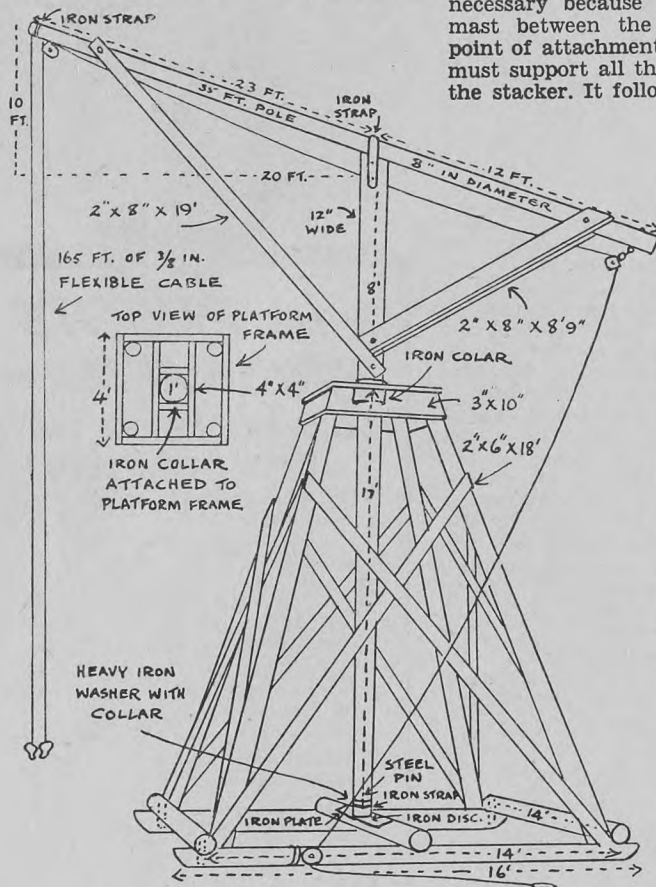
Remove one side of the rack and put the sling shown across the bottom of the rack and load the hay on top of it. At the stack set a couple of saw horses under that side to keep the rack from tipping too



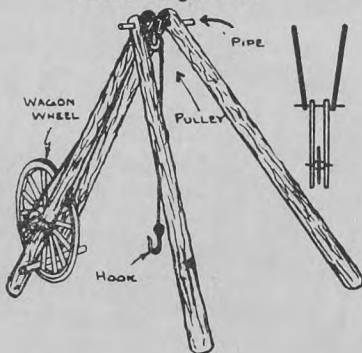
far, hook the heavy  
snaps into the crossed  
rope shown on the

stack, put the tractor or guide rope over the load and tie it in to the ring on the opposite side of the sling, and roll it off the side of the load and right up on the stack. Get up on the stack after every load and straighten it a little and see that it is shaped properly and is kept full and well tramped in the middle. A team can be used instead of tractor if desired.

The 2x4x10-foot pieces can be bored near each end to put a  $\frac{3}{4}$ -inch rope through, but the middle rope should be tied around the 2x4's so as not to weaken them. The 2x4's should be about 7 feet apart. The crossed ropes can be pulled from under the load when it is in place.



## Butchering Hoist



To make this one-man butchering hoist get four straight poles or 2x6's 14 to 16 feet long. Lay in relative position on the ground and bore holes 6 inches from the top end. Then fasten them together with an 18-inch bolt, with a pulley between the two inside poles. Now raise them into a tripod with the two centre poles apart at the bottom just wide enough to allow a wagon wheel to go between them when the wheel is just clear of the ground. Put a short piece of piping or bar through the wagon wheel hub and lash it firmly to the centre poles. Run a rope with a

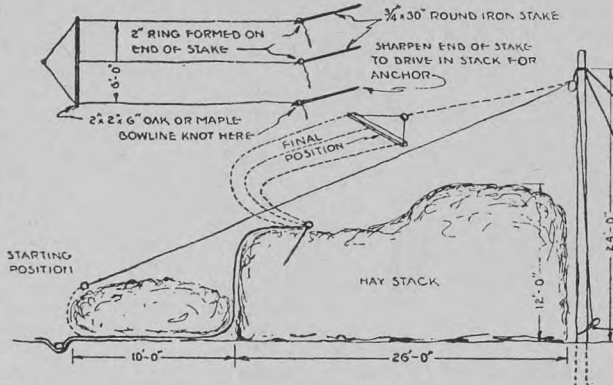


## Roll-in Stacker

This roll-in hay stacking assembly is used in North Dakota. Three men are required to operate it, one to do the stacking, one to drive the team and arrange the slings and the other to operate the sweep rake.

The material needed for building this equipment is as follows: 80 to 100 feet

of 1-inch rope, 3 pieces of  $\frac{1}{2}$ -inch rope 35 to 40 feet long, 3 iron stakes made of  $\frac{3}{4}$ -inch iron bent to form a ring at one end and pointed at the other. One piece of 2x2-inch hardwood 6 feet long, 3 rings 3 inches in diameter made of  $\frac{1}{2}$ -inch iron, and two single block pulleys and a telephone pole 25 to 30 feet long. The pole is held in place with guy wires.



## Swinging Boom Hay Stacker

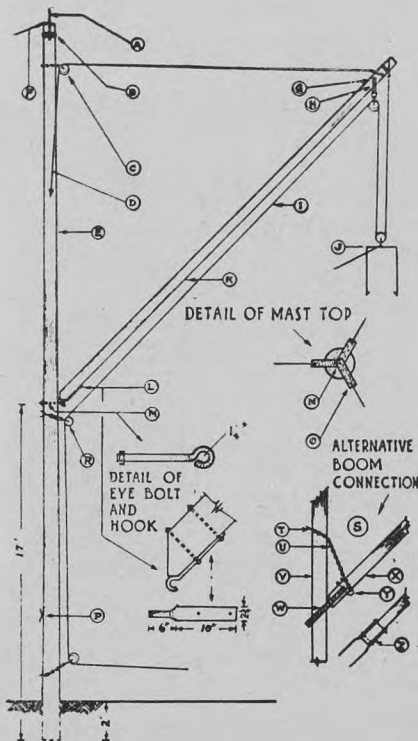
Trees, sturdy fence posts, or dead man logs are usually used to anchor the guy ropes. When a 70-foot guy rope is used on a 40-foot mast, the anchor posts can be placed about 40 feet from the base of the mast. When the mast is to be hoisted, the base is laid in a hole in the ground which has a sloped trench at one side. The top end of the mast is then lifted up onto the top of a load of hay. To raise the mast from this position a rope is attached to the mast about 18 feet from the ground and a tractor or a

team is used to pull the mast to a vertical position, guided by the three guy ropes.

The boom can be hooked onto the eye bolt and raised by the boom hoisting rope. If the alternative method of attaching the boom to the pole (Marked S) is used, it is necessary to place telephone pole step cleats on the mast in

order to fasten the chain around the boom. A cant-hook may be used to turn the mast around so the boom is conveniently located for different parts of the stack. This information and the sketch are supplied by the Central Experimental Farm.

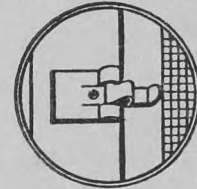
- A. Steel Pin—1-in. x 20-in. Drill a  $\frac{7}{8}$ -in. hole in top of mast 10-in. deep.
- B. Band—Mast bound with wire.
- C. Pulley—Six-in. pulley block attached to  $\frac{3}{8}$ -in. x 8-in. eye bolt.
- D. Boom Rope—1-in., about 80 ft. long, tied to top of boom, and snubbed to bracket at point P. This rope should be of good quality and securely fastened to a heavy bracket or tied around the mast below to sturdy pins.
- E. Mast—10-in. base, 5 $\frac{1}{2}$ -in. at top, 36 to 40 ft. long, spruce, etc.
- F. Guy Wires—Three  $\frac{1}{4}$ -in. cables or 1-in. hay ropes, 60 to 100-ft. long. See items N and O.
- G. Clevis Bolt— $\frac{3}{8}$ -in. x 6-in. bolt.
- H. Clevis— $\frac{1}{2}$ -in. x 1 $\frac{1}{4}$ -in. strap iron clevis about 6-in. deep.
- I. Hoist Rope—1-in. in diameter.
- J. Hay Fork—Or hay sling and trip rope.
- K. Boom—20-ft. to 24-ft. boom, 6-in. at base, 5-in. at top, spruce, etc. Lower end beveled and corners cut to allow boom to swing.
- L. Boom Hook— $\frac{1}{2}$ -in. x 1 $\frac{1}{2}$ -in. flat iron, rounded at one end for hook.
- M. Eye bolt—1-in. x 12-in. eye bolt with 1 $\frac{1}{4}$ -in. to 1 $\frac{1}{2}$ -in. eye hole.
- N. Details of Mast Top—(Items N. & O.)
- O. Guy Plates—Three  $\frac{1}{4}$ -in. x 1 $\frac{1}{2}$ -in. x 8-in. plates. A small clevis may be used on the end of each plate to attach rope or cable to the plate.
- P. Bracket—For snubbing boom rope marked D. A  $\frac{1}{2}$ -in. x 8-in. pin on opposite sides of the post may also be used to hold the rope when it is tied around the post.
- R. Hoisting Rope Pulley—Six-inch pulley block attached to mast by chain.
- S. Alternative Method of Connecting Boom to Mast—(Items S, T, U, V, W, X, Y and Z.)
- T. Boom Chain Pin—Place pin 3 $\frac{1}{2}$ -ft. above boom if this method of mounting the boom is used.
- U. Boom Support Chain—The boom supported by a chain instead of by a hook and eye bolt (L. and M.).
- V. Mast—(See Item E.)
- W. Boom Guide Plates—2 $\frac{1}{2}$ -in. x 2-in. x 26-in. strap iron or light angle iron.
- X. Boom—The same unit as "K."
- Y. Chain U Bolt— $\frac{3}{4}$ -in. round iron U bolt.
- Z. Top View of Boom—Showing guide plates.



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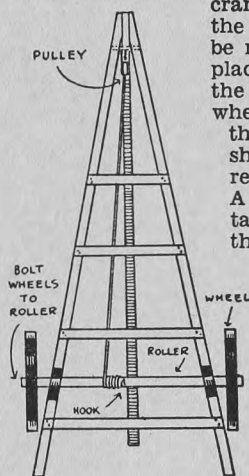
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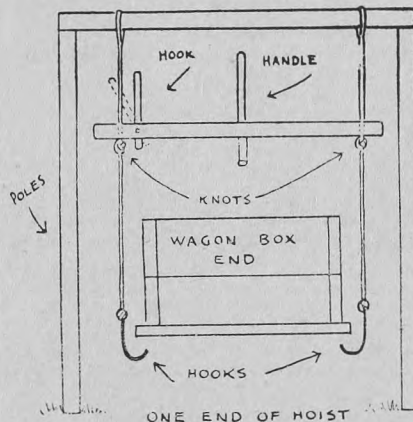
### An Easily Moved Derrick

I find this three-legged derrick very handy, since it has wheels instead of a crank and by lifting the small end it can be moved from one place to another on the wheels. The wheels are pinned through the roller shaft so that both revolve together. A small hook takes the end of the rope when the derrick is at work and the rope can be slipped off when moving so that it will not wind up. A hook of  $\frac{3}{8}$ -inch iron rod or a bit of rope can be used to fasten one wheel to a leg and hold up a load after it has been lifted by the derrick.



### Wagon Box Hoist

A wagon box or rack may be raised or lowered with this device. The windlass pole should not be too big, say not more than four inches in diameter and at that it will raise the box two feet for each turn. The cable or rope passes through the pole. The hook is mortised into the pole and can be slipped over to catch the cable as shown. This holds the box after it has been raised. The handle should be loose in the hole so that it can be slipped through from one end to the other. This shows only one end of the device as four ropes and hooks are needed.—J. D. Jr., Marwayne.



### Three Types of Hay Stackers

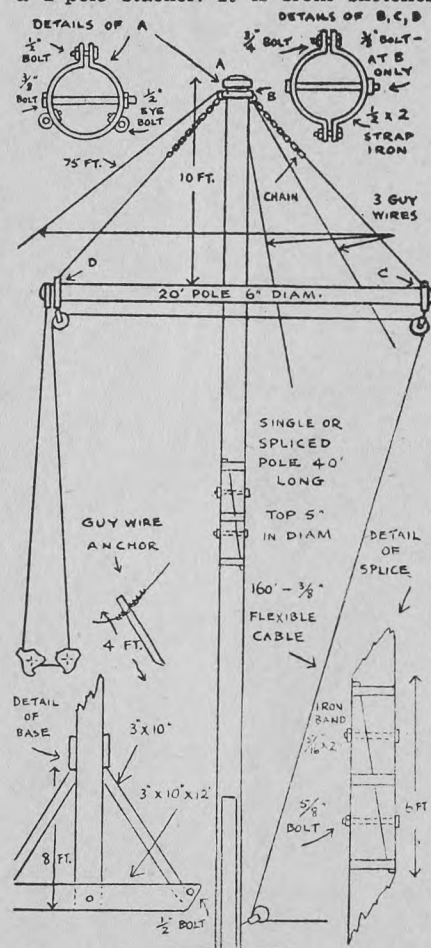
**T**HE single pole hay stacker shown at right is from drawings made by R. W. Peake and H. Chester of the Lethbridge Experimental Station. The sketches are so complete that but little text is necessary to explain them. The main pole is preferably a single pole but two poles may be spliced together as shown to make a minimum height of

45 feet. The top of the pole should be not less than five inches in diameter. When a splice is used it should be six feet long, with the ends matched as uniformly as possible.

The 20-ft. cross-arm has an average diameter of six inches and is suspended 10 feet from the top. As shown in the diagram the cross-arm is in the position assumed when delivering the bundle on the stack; that is, at right angles to the base. Because the cross-arm must make a half turn to take hay from the wagon or on the ground, it is suspended by two chains that wind around the top of the pole. As the sling load of hay is raised clear of the stack, the chains unwind, the cross-arm returns to its normal position and the sling load is carried immediately over the stack. Part of the chains may be replaced by lengths of cable.

One of the three guy wires passes over the stack. Three or four strands of No. 12 gauge galvanized wire are used or ordinary 2-strand fencing wire is satisfactory. The base is made of planks as shown or of stout poles. They are kept in position by stakes. Three 8-inch heavy duty cable pulleys are used and two binding pulleys for the slings. A  $\frac{3}{8}$ -inch flexible cable 160 feet long will pick up a sling load from the ground.

The top illustration on page 39 shows a 2-pole stacker. It is from sketches





furnished by the Swift Current Experimental Station. In operation, one of the guy wires is slack. When the load is being elevated the guy wire coming over the stack is taut and its opposite slack; with the stacker leaning over the wagon. When the sling load is elevated, the guy-wire over the stack is pulled. This swings the stacker with the sling load over the stack until the opposite guy-wire is taut.

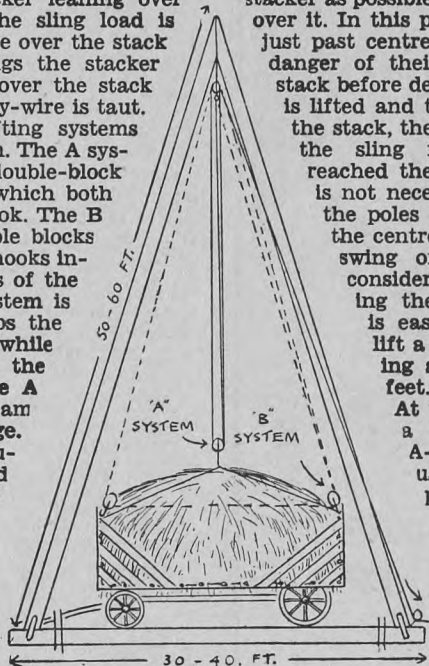
There are two lifting systems shown in the diagram. The A system has a single double-block at the bottom into which both ends of the slings hook. The B system has two double blocks at the bottom. Each hooks in to a ring at the ends of the slings. The latter system is preferable as it keeps the load well packed while lifting and will lift the load higher than the A system. It gives the team a 4-to-1 advantage. Half-inch cable is usually used. A good stacker will take a large 10x20 foot basket rack load of over two ton at one lift.

The guy cables are anchored at from 50 to 60 feet from the sill of the stacker. The cable which supports the poles when they are over the stack must be quite strong to take the

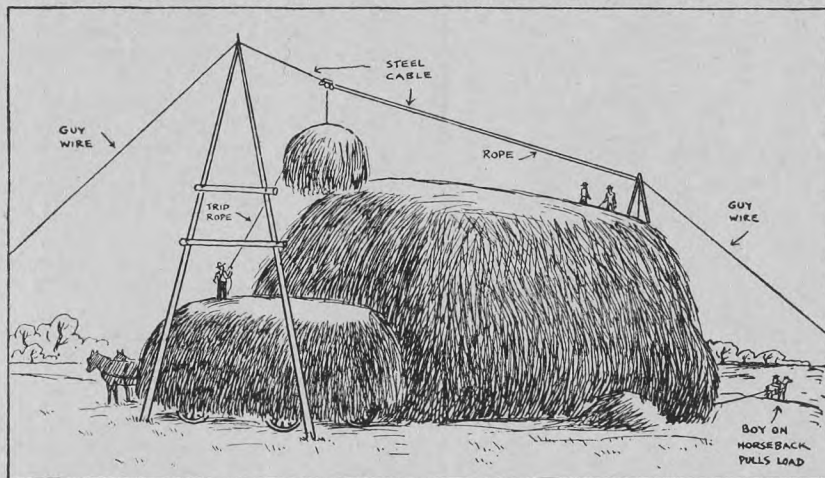
shock when the poles are swung over. A ½-inch steel cable is sufficient; often an old cable of a larger size is used. The other guy-cable may be lighter.

The load is driven in as close to the stacker as possible and the poles swung over it. In this position the poles are just past centre so that there is no danger of their swinging into the stack before desired. When the load is lifted and the poles swung over the stack, the load is tripped with the sling rope when it has reached the desired position. It is not necessary for the top of the poles to be over as far as the centre of the stack as the swing of the load permits considerable range in placing the load. This stacker is easy to work and will lift a heavy load for making stacks as high as 40 feet.

At the bottom is shown a cable stacker. The A-shaped frames are usually made from poles. The purchased material consists of a reversible cable carrier, a double harpoon fork or grapple fork, or slings, 150 feet of ½-inch galvanized steel cable on which the carrier travels and which is used for the end guys, 130 feet of manila carrier rope and necessary bolts, etc.

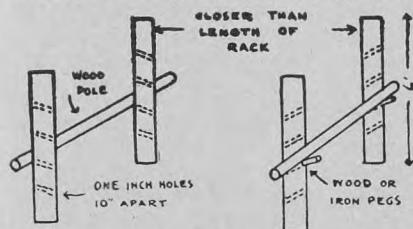


which the carrier travels and which is used for the end guys, 130 feet of manila carrier rope and necessary bolts, etc.



### Lift for Hay Rack

Many designs for one-man rack lifters have been sent in. This one may not be



the quickest to operate but it is the cheapest and simplest. It came from

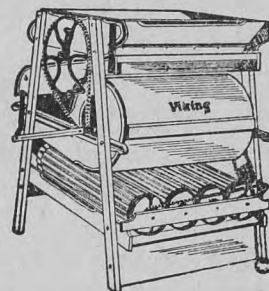
a Saskatchewan farmer. All that is needed is four posts, about six inches in diameter and seven or eight feet long, and two 15-foot poles. Holes about 10 inches apart are bored in the posts at an angle. Bolts or hardwood pins may be used to support the poles. One corner is lifted at a time. It can also be used for lifting a wagon box.

### Fan Belt Repair

If the fan belt on your car happens to break, a narrow strip cut from an old inner tube will generally answer the purpose until you can drive to a service station.

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### Overhead Hay Stacker

**T**HIS overhead haystacker was designed by F. F. Parkinson, School of Agriculture, Olds, and the drawings are by L. E. Pearson, Institute of Technology, Calgary. A side view and a bird's-eye view are shown, and the other drawings are numbered to refer to the parts shown in the main drawing.

Item 1 shows the runners, which are fir, preferably creosoted, 6"x8"x20' long. Notice that the section of an old tire casing is attached to keep the cable from catching under the back part of the runner. Also notice in the main side view drawing that a piece of 3"x6" by 8'6" long is put in place to hold the hoist up when travelling.

Item 2 is the front cross piece to which tackle is attached by means of a U bolt shown in Item 26. It is 6"x8" fir 7'8" long.

Item 3 is a cross piece 3"x6" by 7' long, which holds the iron rods supporting the springs.

Item 4 is the rear spreader 3"x6"x7'. Item 5 of which two are required are 6"x6" by 20' long. They are the main arms of the hoist.

Items 6 and 7, the main cross pieces of the hoist, are 4"x6"x12' of fir.

Item 8. The teeth are staggered, the short ones shown in Item 8, are 2"x6" by 12' long and tapered down to 2 1/4". Six are required. Item 9, shows the long teeth 2"x6" by 13'6". Of these five are required.

The upright teeth shown in Item 10, are of 2"x4" and are 6'6" long. Twelve are needed. They are tapered down to 1 1/4" at the point.

Item 11 shows the uprights brought together in a V shape at the top and taking the upper end of the tackle. Two are required, a right and a left, and they are 4"x6" fir, 14'5" long.

Item 12 is the spreader across the uprights near the bottom and is 2"x4" fir.

Item 13 shows metal spreader at the top of Item 11. It is made of 3/4"x2" iron with 11/16" holes.

Item 14 is a 1 1/4" steel bar 15 1/2" long with a 3/8" hole 3/4" from the end to take cotter. It takes the upper end of the tackle.

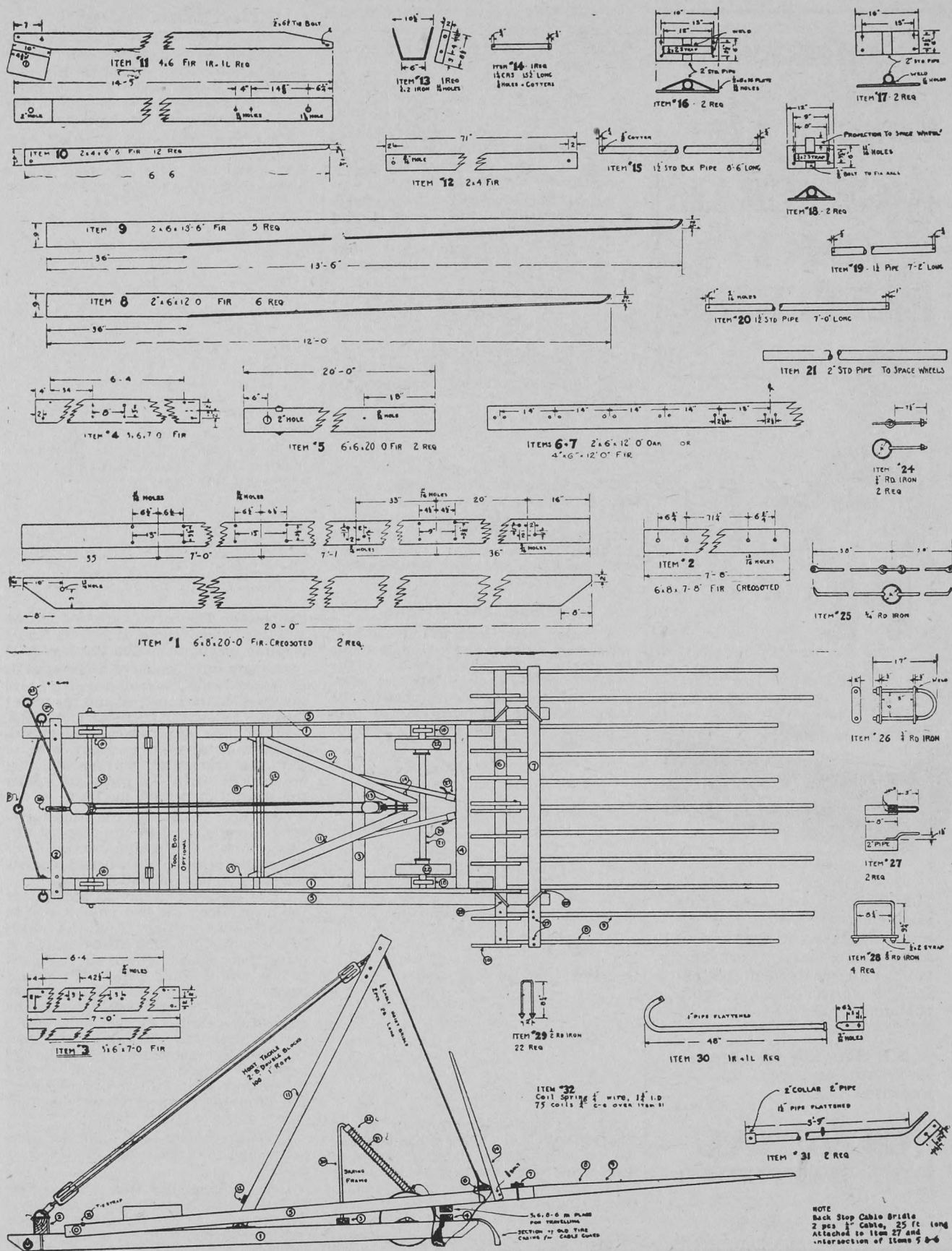
Item 15 forms the axle of the main hoist. It is a piece of 1 1/2" standard black pipe 8'6" long with holes 3/4" from each end to take 3/8" cotter. It is fastened to the runners by Item 16, of which two are required. An iron plate 1/2" by 6"x16" is bolted on to each runner and a strap 1/4"x2" is welded on to these plates and the pipe as shown.

Item 17 shows the similar mechanism by which the uprights (Item 11) are attached to the main runners, while Item 18 shows the attachment of the axle for the wheels (Item 22) to the runners.

Item 19 is a piece of 1 1/2" pipe 7'2" long for supporting the uprights.

Item 20 is the 1 1/2" standard pipe 7' long which serves as an axle for the main wheels, while Item 21 is a 2"





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standard pipe to space the wheels. Item 22 shows the wheels.

Item 23 is a 4" ring attached to the end of the hoisting cable.

Item 24, of which two are required, are made of  $\frac{3}{4}$ " round iron through which the front end of the stacker is staked to the ground, while Item 25 takes the hitch for hauling.

Item 26 shows the lower U bolt attachment for the tackle.

Item 27 shows a piece of 2" pipe with a lug, which slips over the  $1\frac{1}{2}$ " pipe carrying the coiled spring.

Item 28, of which four are required, fasten the main fork to the hoisting beams.

Item 29, the U bolts for fastening the teeth of the work to the cross timber (Item 7).

Item 30, of which two are needed, the right and the left, 48" long of 1" pipe flattened to hold the upper end of Item 31.

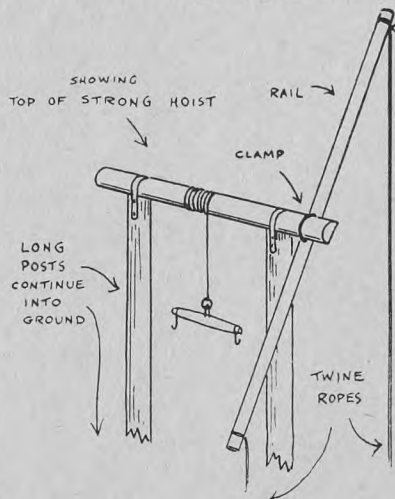
Item 31 is a piece of  $1\frac{1}{2}$ " pipe flattened at the bottom which carries the spring.

Item 32 is a coiled spring of  $\frac{1}{4}$ " wire,  $1\frac{3}{4}$ " inside diameter, 75 coils at  $\frac{3}{4}$ " centres, carried by Item 31.

The back stop cable bridle is of two pieces of  $\frac{1}{2}$ " cable, 25 feet long attached to Item 27. The spring takes up the jolt when the hoisted load is discharged.

## A Good Strong Hoist

A strong hoist that will lift a beef carcass or other heavy object is made by sinking two strong posts in the ground, bracing them firmly and placing a roller on the top as shown. The tops should be hollowed out to take the roller and two strong pieces of

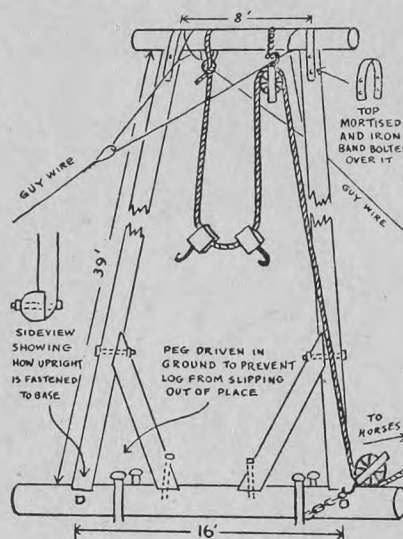


strap iron carried over the tops to hold the roller in place. The rail is fastened to the roller with a clamp and a piece of twine rope attached to the ends. The weight can be held at any height by giving one of the ropes a hitch around the post. An old single tree works well as a spreader.—K. Johansen, Bashaw, Alta.

## Hay Unloading Derrick

All over the country there must be many who are looking for some device to do the job of unloading hay, for different reasons; some to save work, some to save the leaves of alfalfa hay that are broken off in handling.

This hay hoist does the job very satisfactorily and can be made at very little cost. The poles are made into a quadrangle with the top narrower than



the bottom. The corners are well braced and the whole thing is bolted firmly together as shown in the illustration.

The guy wires, made of a few strands of fence wire twisted together, are fastened on, the rope tied and the pulley fastened before the framework is raised.

When the framework is raised, lengthen or shorten one guy wire so that the framework will be standing up straight when the ropes are lifting the slingful of hay off the load.

Lengthen or shorten the other guy-wire enough to allow the top of the frame to fall to a position exactly over the centre of the place where you want the stack to be. The action is this:

Drive the load of hay to position by the hoist. Hook the two pulleys, one in each end of the sling. Hitch the horses to the end of the long lifting rope, and drive them ahead. When all the slack in the rope is taken up and the weight comes on it the top of the framework will be pulled to the load as far as the guy-wires permit. As the slings leave the hay rack they will swing away from the load, the momentum will make the hoist fall toward the stack till stopped by the guy-wire. Pull the trip rope on the sling and down the hay falls right where you want it.

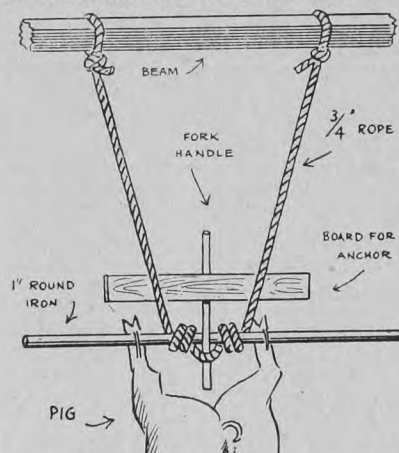
Drive the horses back, pull down the slings and you are ready for the next load.

Using a hoist like this it is possible to build a high stack beside the barn. This means one can put more hay in a small stackyard where it is handier for feeding.



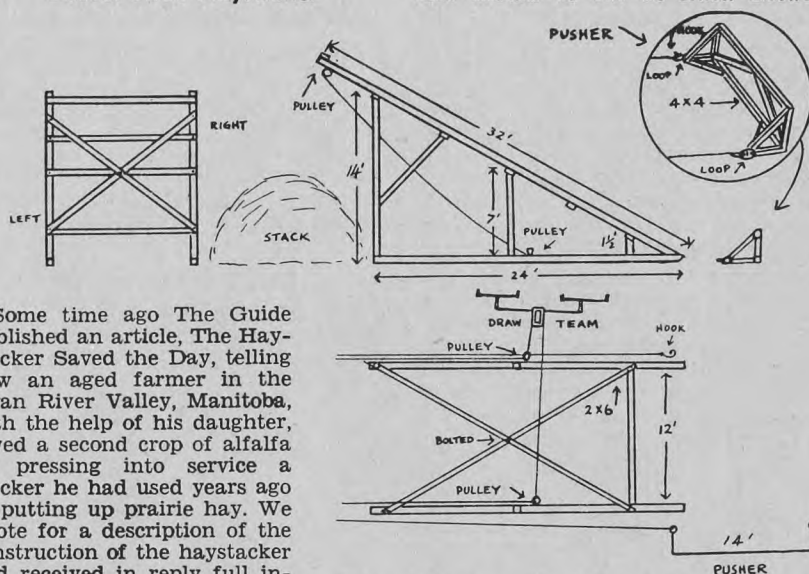
### Carcass Hoist

This is a real good butchering hoist with which one man can raise the heaviest hog or beef with ease. The  $\frac{3}{4}$ -inch rope must be long enough to reach the animal when the two ends



are tied to the beam. Insert an inch-round iron rod through the cords of the animal, bring the rope around under the rod and with a piece of fork handle twist the rope round and round the rod. This raises the animal. When it is high enough drop a piece of board in behind the fork handle to anchor it. But do not let the fork handle slip. That would be dangerous.

### Beaver Slide Haystacker



Some time ago The Guide published an article, The Haystacker Saved the Day, telling how an aged farmer in the Swan River Valley, Manitoba, with the help of his daughter, saved a second crop of alfalfa by pressing into service a stacker he had used years ago in putting up prairie hay. We wrote for a description of the construction of the haystacker and received in reply full information from Fay A. Stewart, the lady who helped out in the emergency, together with drawings and bills of material used.

The base of this haystacker is a pair of timbers 6 or 8 by 12, and 24 feet long. Logs would do where they are available. They are held apart in front by a cross piece 4x4 and 12 feet long. There is no cross piece between them at the back or stack end as it would interfere with the stack. They are braced with two diagonal pieces of strong 2x6 stuff, bolted to the

runners at each end and to each other in the middle as shown in the diagram.

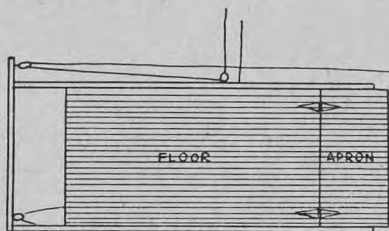
The next step in the construction is the frame work at the rear or stack end. The upright posts are two pieces of 4x4, 14 feet high. Three or four crosspieces are bolted on as shown. For these, 2x6 scantling, 12 feet long, are used. They are braced diagonally with two 2x6 scantling 16 feet long. The pieces are thoroughly bolted to the uprights and bolted or nailed together where they intersect as this adds to the rigidity of the frame.

Now take the side view, shown in the diagram. A pair of centre posts is provided, with a cross piece across the top, to support the slide up which the hay is drawn. These posts are seven feet high. It would be well to brace these also. Near the front there is also a pair of short posts, 18 inches high, of 4x4 stuff, with a crosspiece. This crosspiece carries the lower ends of the floor boards and the upper edge of the folding apron, which is described below. There is also a brace from each end post to the crosspiece which is located on the frame as shown. Note by the photograph that these two braces meet at the upper end in the middle of the crosspiece. This gives greater rigidity to the frame.

The main timbers of the sloping slide, which carry the load, are 32 feet long and should be 6x6 at least. Between

The load falls through the space between the end of the floor and the 2x6 crosspiece at the top end of the timbers, which carries the pulleys. The lower end of the floor ends in the middle line of the crosspiece supported by the short, 18-inch posts.

From the lower edge of the flooring to the ground is a hinged apron, made of the same material as the flooring.



This can be folded back when the stacker is being moved or is not in use. Two or preferably three heavy strap hinges are used. When the load of hay is brought in with the sweep it is drawn up on this apron, which ex-

tends a foot or two beyond the lower end of the main frame.

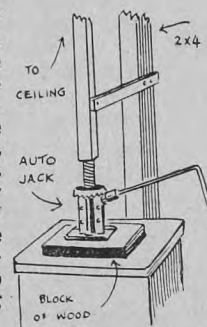
The construction of the pusher for elevating the hay, is shown in the circle. It is 14 feet long and is made of a 4x4 with triangular end frames of 2-foot bases and uprights, thoroughly braced. Two  $\frac{3}{4}$ -inch ropes are used. The long one, 80 feet long, is on the side away from the horses and it is fastened to the pusher with a wire loop. The shorter one, 68 feet long, carries a hook at the bottom, so that it can be detached from the pusher. When the pusher is empty, the rope is unhooked from it and it is swung to the side out of the way of the sweep.

The ropes are carried from the pusher up through the pulleys attached to the top crosspiece. The long one is on top of the frame and the short one, on the pulling side, is clear of the frame. This allows the ropes to come down to the lower pair of pulleys clear of the frame work.

The sweep of hay is swept up on to the apron. The pusher is swung around behind it. The go-ahead signal is given. The team moves away sideways from the stacker. The load is pulled up the slide and dumped on the stack.

### Auto Jack for Screw Press

This shows how I used an ordinary screw type auto jack to secure the necessary pressure to glue a stiffening rib on the under side of a small table top. It can be used for almost any kind of glue work where pressure is required and also for pressing cheese, lard, etc.

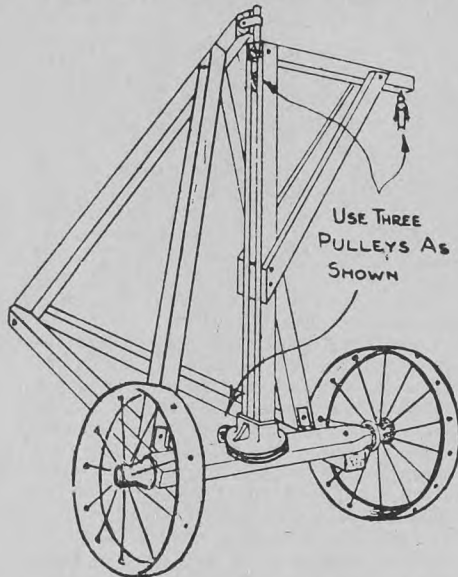


### Pump Cleans Seed Drill

A tire pump can be useful in cleaning the seed drill of dirt and seed. This is safer than any other method because the compressed air from the pump cannot damage the drill.

## Portable Derrick

Here is a very handy portable derrick, for loading rocks, butchering hogs and cattle, digging pits, and many jobs around the farm. The axle and wheels are from an old threshing separator, but a heavy auto axle could be used by

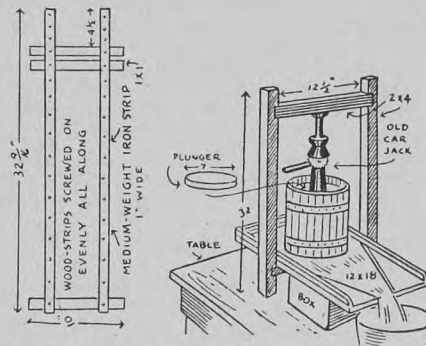


turning the drive shaft tube straight up, putting a pipe or shaft in the tube to serve as the turning post, and clamping a heavy wood frame to the axle with diagonal support for the anchor part. The boom brace could be fastened loosely at the bottom with a band around the drive shaft tube. The bolster socket serves as a pivot for the bottom of the swinging post, while a stub shaft and a piece of strap iron makes a bearing at the top. A pulley is attached to the outer end of the boom or swinging arm, a second is put between the members of the upright post at the top, and a third one is fastened close to the axle at the bottom. The location as shown is intended for the pull to be on the side away from the weight to be lifted, but the pull can be from any desired direction by properly locating the lower pulley. The upright is about ten feet high, and the boom or arm is 12 feet long. Loads up to 1,000 pounds can be lifted easily, swung to either side, and then let down.—I. W. Dickerson.

## Simple Cider Press

Several answers were received to a request from a reader for instructions on how to construct a cider press. This one was selected for its simplicity and the draftsmanship of the sender. The instructions are as follows:

"All that is needed for the construction of this cider press is two strips of medium weight galvanized iron, an old automobile jack and a supply of lumber and nails. Shape 21 strips of wood to the dimensions shown in the drawing. Lay them side by side on a flat surface. The iron strips project  $4\frac{1}{2}$  inches past the

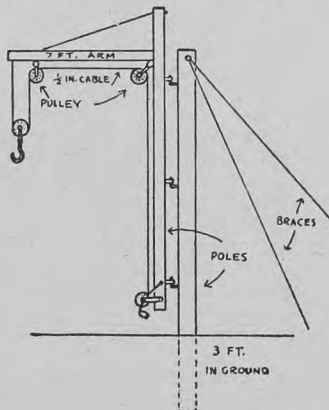


first wooden strip and are  $1\frac{1}{2}$  inches from the ends of the wooden strips. The iron is fastened to them by  $\frac{3}{4}$ -inch nails, in each case after a hole has been started by using a centre punch. All but three of the wooden strips are placed in this manner. Then the other end is bent around to form a drum and the nails pass through the two ends of each iron strip while these three are being fastened in place. You have then a slotted cylinder or drum.

"The frame is made of 2x4 and must be nailed together securely. The trough is made of a board 12x18 inches with strips nailed on the sides and the back to prevent the juice from running over the sides. Then cut a circle from a 2-inch plank to fit snugly into the drum, but loose enough to let it slide up and down. The drum is set exactly in the centre of the frame. A bag of burlap to fit the interior of the drum will hold in the fruit and make the extracted juice clearer.—F. A., Celista, B.C.

## General-Purpose Derrick

This derrick is handy for butchering pigs and for lifting oil barrels, racks and wagon boxes. A good stout post is let three feet into the ground and braced with wire. The arm, which is seven feet long, is morticed into the upright and also braced with wire. A half-inch cable is used. The upright is swung on three hinges and the loads can be swung around to either side out of the way.—Jack Shier, Chinook, Alta.



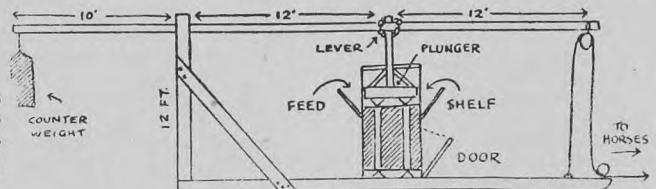
## Home-Made Hay Press

The skids are about 24 feet long and are 6x6, the uprights of the same size. The lever, which may be made from a tree, extends 10 feet beyond the fulcrum to permit the counterweight to lift the plunger to the top of the box. It must be stiff enough to stand the pull of the team, doubled by the use of a block.

The size of the box can vary. If it is 18x24 inches inside, it makes a handy sized bale. It is eight feet high. For convenience in getting out the bales it may be made 23 inches at the back and 24 inches at the front.

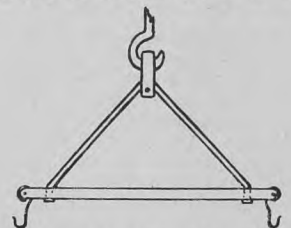
Ordinary planks are used vertically to make the box and are so placed that cracks at the back and front are left sufficiently wide for wiring. The front is cut half way up and the lower section hinged at the bottom to provide a door for the removal of the bale. The sides are left open for two feet at the top with sloping shelves to aid feeding. Lining the box with tin greatly reduces friction. An unyielding fastening for the door must be provided.

The plunger is 6x6 and six feet long, fastened to the lever with a piece of chain. The head of the plunger should fit loose in the box and be well braced to the plunger. The procedure is to shove as much hay into the box as possible, give a good steady pull, then back the team up and fill again as often as necessary. As the team backs up the counterweight will lift the plunger. With this outfit two men can make 60 bales a day, each weighing 100 pounds.



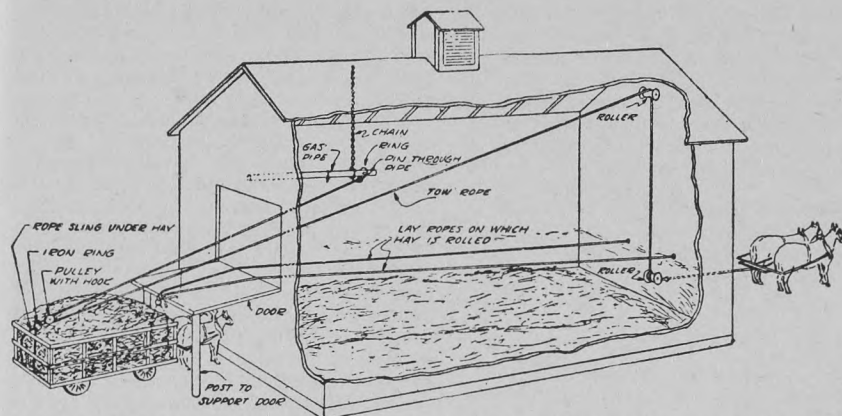
## Beef Hanging Device

There are not many model T cars travelling the highways, but you can still find quite a number, or at least a



number of parts, around most farms. Here is a real good use for the front axle and the radius rods. If you take off the steering knuckles but leave the bolts, then hang on good hooks, it makes a great way to hang up a beef while you are butchering it. We put a clevis at the ball and socket end and hang it on a chain hoist. This makes the most safe and convenient way of dressing a beef that we have ever found.—T. L. Shepherd, West Plains, Sask.

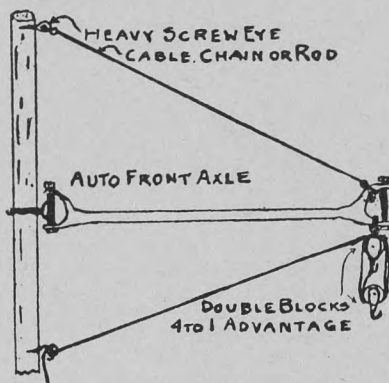




This is a diagram of a hay unloader developed by a farm manager south of the line. It rolls the load off at one operation. The ring on the end of the tow rope presses against a pin in the gas pipe and slips off when the pulley with hook reaches it. Usually in this country the team on the wagon would be standing just inside the stable door.

### Handy Farm Hoist

A handy hoist for raising heavy hogs at butchering, or lifting the engine out of a car or tractor, can be made from the front axle of a car, a cable or chain about six feet long, and a fence stretcher or block and tackle. It can then be swung from a tree, a heavy pole, or the frame of a building, and has enough side swing to make it convenient



### SECTION 4.

## Power Saws

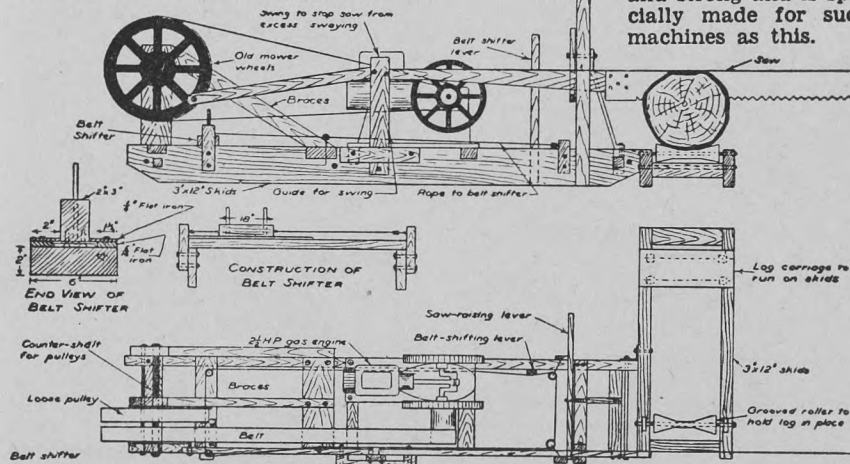
### Power Drag Saw

This design of a power drag saw is by Prof. L. G. Heimpel, of Macdonald College, Que. It is run by a  $2\frac{1}{2}$  h.p. gasoline engine which is belted to two old mower wheels from which the lugs have been removed. One of them runs free and there is a belt shifter to shift the belt from one to the other. An end and side view of the belt shifter is shown. It is connected to the lever by a rope.

The mower wheel which drives the

saw, is cranked to a swing to prevent excess swaying. From this swing an arm connects directly with the drag saw. The arm runs through a guide, which slides up and down in a frame so that the saw can be raised and lowered. The second man pushes the log or pole along the grooved roller and holds it in place while the block is being sawed off.

The skids are of 3x12 planking, carefully framed together. The saw blade is thick and strong and is specially made for such machines as this.



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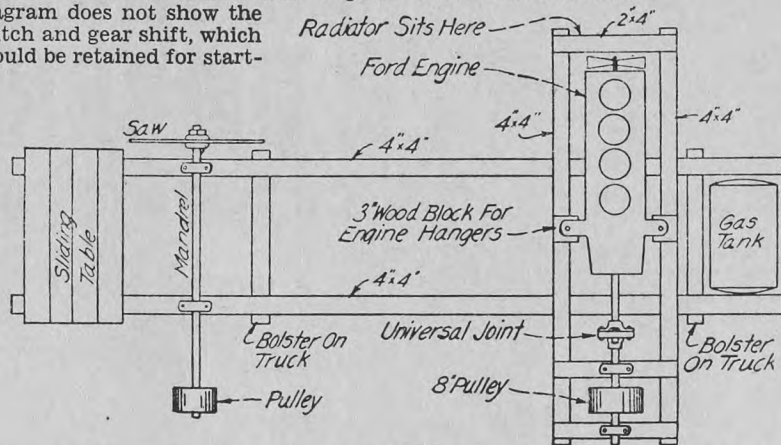
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## Practical Auto Belt Power

The diagram shows a good way of using an old auto engine for portable belt power to drive a wood-sawing outfit. As shown the frame is made of 4x4's bolted rigidly together and set on an old wagon to be hauled by team or towed behind a car or truck. The engine diagram does not show the clutch and gear shift, which should be retained for start-

ing and for getting speed variations. If a self-propelled outfit is desired, the engine unit could be fastened across an auto chassis right behind the steering wheel, and the auto frame extended to the back with 4x4's or auto frame members to support the saw, feed grinder, or other driven machine.



## Points Concerning a Homemade Sawmill

This sketch shows the construction of a home-made sawmill erected by James Anderson, of Hamiota. They indicate sufficiently how a sawmill of this kind can be constructed at little cost. Of course, to build and run such a piece of machinery requires a man of some mechanical aptitude. There are just a few points, however, which should be remembered. They are suggested by Prof. L. G. Heimpel, of Macdonald College.

Set the saw plumb and true. Set the saw guide and adjust the guide pins clear of the teeth and just touching the blade. This should be done while the saw is in motion, care being taken that

the pins do not push the saw to one side or rub hard enough to cause friction. After screwing the saw up between the collars, examine the front or log side of the saw to make sure that it is flat.

If the saw is found to be rounding on the log side, cut a ring of paper about half an inch wide the size of the collar on the outside, oil it and stick it on the face of the tight collar around the outer edge. Then cut another ring of paper the same width, make the hole the same size as the hole in the saw and put this small ring between the loose collar and the saw and screw up the collar. If the two rings are not enough put in more until the saw stands straight and true. If the saw hangs dishing on the log side reverse the rings of paper.

If the saw blade heats in the centre

when the mandrill runs cool in the box, cool it off and give it a little more lead into the log. If the saw heats in the ring and not in the centre, cool it off and give it a little more lead out of the log.

A saw should have a lead into the log of  $\frac{1}{8}$  of an inch in 20 feet. To give it this lead, move the carriage forward until the rear head block is opposite the saw. Fasten a stick on the block so that the end or point of the stick is set  $\frac{1}{8}$  of an inch from the saw. Now run the carriage back 20 feet from the centre of the saw. Stretch a line from the end of the stick along the face of the saw so that it touches the saw on both edges. If it does not touch the saw on both edges adjust the main mandrill box by the set screws on each side until it does.

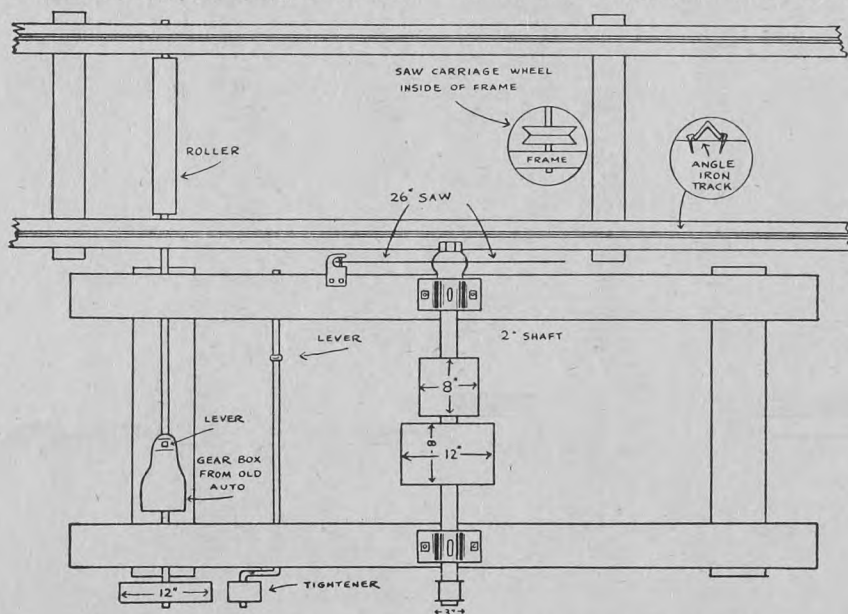
The guide block and pins must be given special attention. They should support the blade above the centre of the saw because the upper half of the saw does all the work. Guide pins should be made of hard end wood. They are set to clear the bottom of the sockets of the teeth by about  $\frac{1}{4}$  inch.

The size of the saw should be governed by the size of the logs to be cut, regardless of the amount of power used. The diameter of the saw should be approximately one and a half times the diameter of the largest log to be cut. Manufacturers give the maximum speed at which their saws should be run but these speeds cannot be used for portable mills because of insufficient power. They are given by saw makers to show what the saw will stand and not what it is supposed to accomplish in practical work every day.

Do not file all the teeth from the same side, especially if each alternate tooth is bent for the set. File the teeth that are bent from you on the one side and leave them on a slight bevel, with the outer corners a little the longest and then reverse the saw and treat the other side in the same manner.

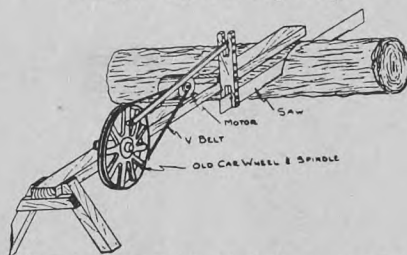
Saw teeth wear narrow at the extreme points, consequently they must be kept spread or swedged so that they will be widest at the very points. Never set teeth when the saw is frozen.

The greatest wear on the teeth is on the under edges. File nearly to an edge, but not quite, leaving a short bevel  $\frac{1}{32}$  of an inch wide on the underside of the point. But in no case file to a point or thin wire edge. Do nearly all the filing on the underside of the teeth and see that they are all swedged at the points. File square across and see that they are all given an equal amount of set.



Sketch of the main features of Mr. Anderson's home-made sawmill.

## Power Saw For Big Logs



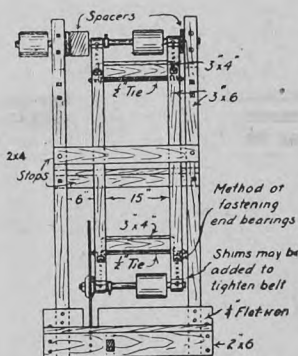
Here is a diagram of a power saw for large logs. It is powered by a washing



The sketch shows a steel pole saw frame with a swinging table which works very well. The frame is made of 2x2 inch steel angle iron taken from an old seed drill. The table is made of 1½x1½-inch angle iron taken from an old binder. The hooks are 2x½-inch flat steel. The hooks should be made according to the size of blade used. For a 24-inch blade the hooks should be about 11 inches. The base is an old car frame about five feet long. The mandrel is made from an old drive shaft taken from an old Chevrolet car. The frame stands 6 ft. 6 in. high and is about 3 ft. 6 in. wide.

When heavy logs are being sawn, a swing saw can be used to advantage, because the logs are in a stationary position while they are being cut. In using the swing saw, one end of the log is placed on the saw table and the other end of the log is placed on a trestle which is the same height as the saw table.

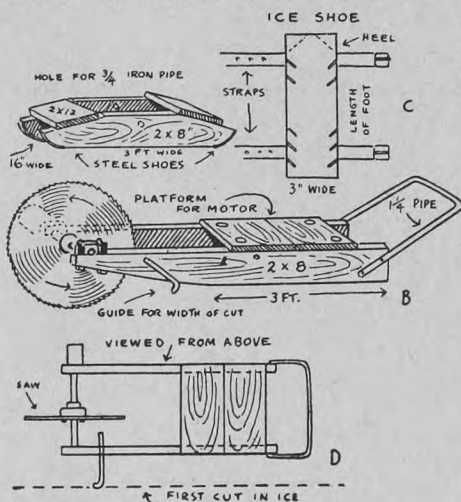
Where a portable sawing device is desired, the swing saw unit is usually mounted on a low wagon gear. For stationary work the saw frame is blocked



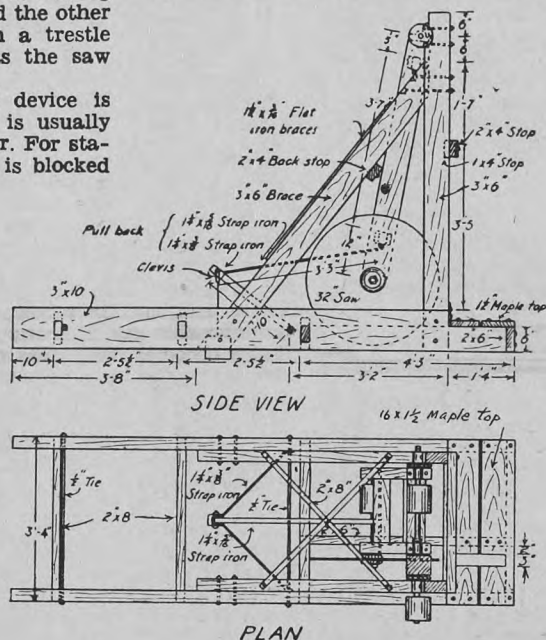
up so that the saw table is about 30 inches from the ground.

In constructing the sawing unit, all parts of the frame should be well braced and rigidly constructed. The pull back device consisting of a tie strap, a 1¼-inch by ¾-inch strap iron hinge, and a weight, is designed to hold the saw back firmly and to reduce pull as the saw is drawn through the log. A suitable weight can be selected for the pull back device and it must be securely attached to the tie strap and hinge.—W. Kalbfleisch.

I have used this ice saw for 11 years and it has given entire satisfaction. I use a 3-h.p. engine and a 30-inch saw.



and can cut 12 inches deep. I used an old brake drum out of a model T Ford car for bolting the saw to, using two 3/8-inch bolts which go through the saw and collar. The holes in the plat-



form on which the motor is set has oblong holes so that the motor can be slid backward for tightening the belt. This assembly is mounted on the sleigh, shown at the top left. The weight is carried by a piece of  $\frac{3}{4}$ -inch iron pipe which passes through the holes in the runners of the sled and in the side pieces of the part carrying the saw. This allows you to tilt the saw up and down, according to the depth you want to cut. You go backwards while pulling the saw. Ice shoes can be made from flat iron, with slits cut in at an angle of  $\frac{3}{4}$ -inch and the points turned down for spikes.

I cut the ice both ways and then cut about every five cuts with a cross-cut saw and split the balance out with a bar. The blade of the bar is two or three inches wide and tapered from half-an-inch thick at the top to a thin edge. It is the wedging that splits the ice.—Lee Bussard, Wetaskiwin, Alta.

Prof. L. G. Heimpel, of Macdonald College, Que., designed this tilting saw

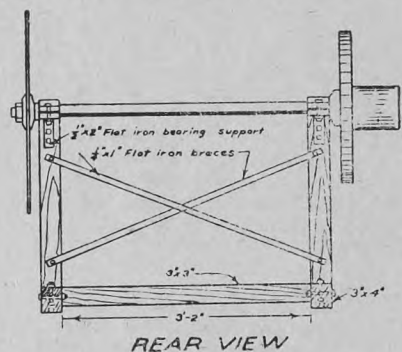
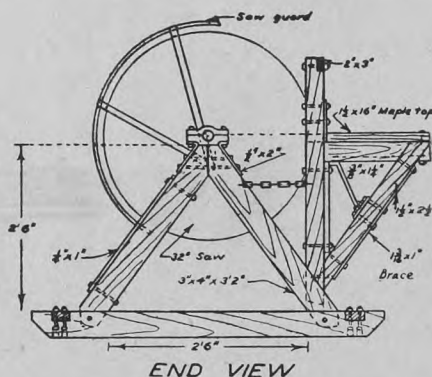


table. These views of it are given from his drawings. They make it self-explanatory. The sills are 3x4, or could be made of 4x4, and are securely framed. The uprights are of the same dimensions. A saw guard is provided and this should not be overlooked, as a whirling saw can



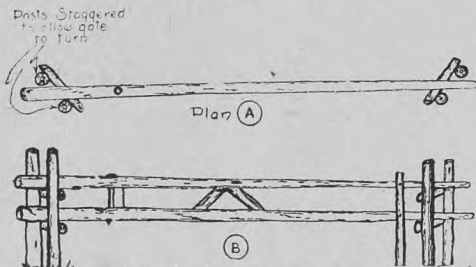
be an instrument of destruction and proper precautions should always be taken with dangerous machinery. A 32-inch saw is recommended.

## SECTION 5.

# Gates, Fences, Clotheslines

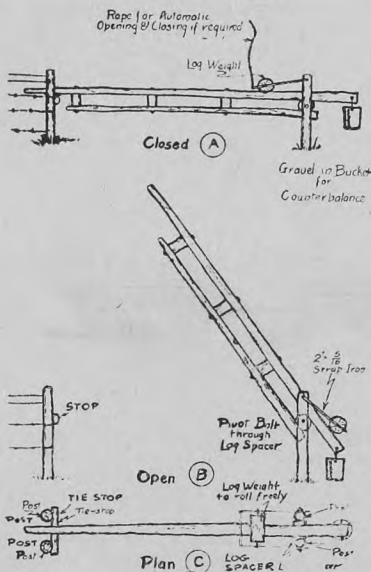
Wherever fences are required, the need to get from one side to the other is almost always an inevitable certainty. The means, however, may vary with requirements. The old fashioned stiles are useful, convenient and inexpensive where travel is only occasional. Gaps are more desirable where travel is more frequent and pails of water, etc., must be carried and at the same time livestock is to be excluded as from the grounds around the farm home. Gates that are used frequently must be well constructed and well hung. Back pasture gates, which are opened only a few times a year, need not be expensive but should be strong and safe. Gates which provide easy access to cars and trucks, without the driver having to leave his vehicle to open or close them, invite the greatest appreciation. The following sketches are intended to provide suggestions. Materials available, as well as the need, are intended to determine the construction and means employed.

## Simple Pole Gate



The simplest of all gates. It has neither hinges nor latch. The upper view shows the arrangement of the posts.

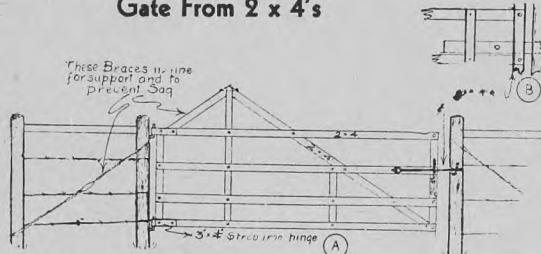
## Cantilever Gate



A simple automatic opening and closing

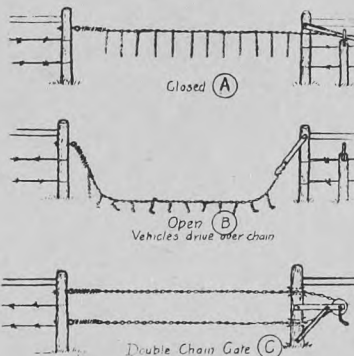
ing gate. The rope attached to the weight is carried through pulleys on high posts and the end drops down where it can be reached from a vehicle. Three views of the gate are shown.

## Gate From 2 x 4's



A simple gate. Two well known designs of latches are shown.

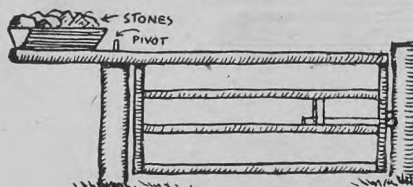
## Chain Gates



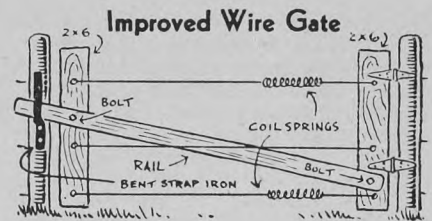
Two designs of gates which can be lowered to allow a vehicle to pass over. A and B show one closed and open. Short pieces of chain drop down which assist in turning stock. It is tightened by a lever, which comes to rest on a lever stop below dead centre. C shows a double chain gate with the chains passing through holes in the post and tightened by a crank and roller. Plow springs are used where shown.

## Sagless Gate

This gate will not sag and will last. I have seen one in Ontario in good condition after 50 years of service, and occa-



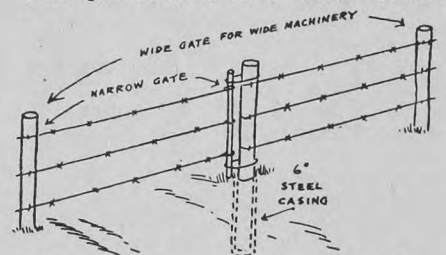
sionally have seen one in western Canada. It is generally made of poles, as shown in the diagram and the stones are just enough to balance it. Where poles and stones are available the cash money cost is nil.—D.C.R.



Here is a handy wire gate that is not hard to open. We use them all the time. Fasten the cross rail to the upright 2x6's and let it project past the post, dropping it behind the bent strap iron. This gate can be made any length or height and with as many wires as the farmer wishes. — T.C.S., High River, Alta.

## Widening the Gateway

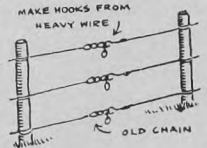
Now that nearly every farmer has wide tractor machinery the narrow gates provided for horse-drawn outfits



are not wide enough. To remedy this set one of the gate posts into a six-inch iron pipe. When drawing one of the wider outfits simply take the post out of the casing and you have twice the former width. It will be necessary, of course, to rearrange the bracings of the posts.—A.S.W., Alta.

## Emergency Gate

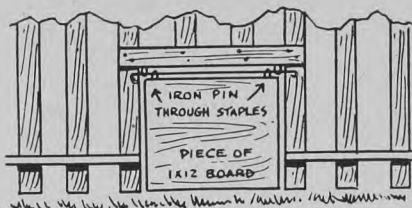
To avoid driving a team on the highway when exchanging work with an adjoining neighbor, an emergency gate made in the dividing line fence comes in mighty handy and saves much time in passing through binders and combines. Cut each barb wire, fasten a hook to one cut end and a few links of chain on the other end, and this will make a neat and serviceable gate. If for any reason the wire becomes loose, tension may be taken up by dropping a link from the chain. If this is to be used frequently it would be well to brace both posts. A strong spring in each wire would help to keep up the tension.—I.W.D.



## Dogs Preferred

Here is a sketch of a doorway in a picket fence which will let the dog through but excludes the feathered denizens of the barnyard. It works. It is simply a piece of board hung in an

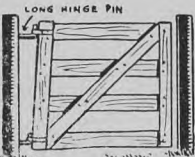




opening which has been framed in the picket fence. It is hung on an iron pin held by staples and will swing both ways. The dog just pushes it up and slips underneath but the fowls are fooled. — John P. Napier, Kilgobbin Farm, Royal Oak, Saanich, B.C.

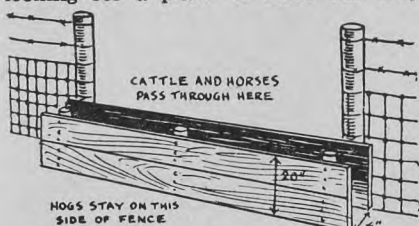
### Self Closing Gate

A farm gate that is self closing is made like an ordinary gate except that the top bar is four inches shorter than the bottom one. Also the upper hinge pin is longer than the lower one by the same amount. When the gate is swung open the latch end will be elevated so that it will swing shut of its own weight no matter how much or how little it is opened.— Bernard Schick, Carmel, Sask.



### "Cattle Preferred" Gate

In cases where it is desirable to keep hogs from going into the field with horses or cattle, try using a gate built along the lines shown in the sketch. As there is considerable strain on such a gate it should be made with planking. Horses and cattle will step over it, but hogs go to one end or the other. In looking for a place to come out they



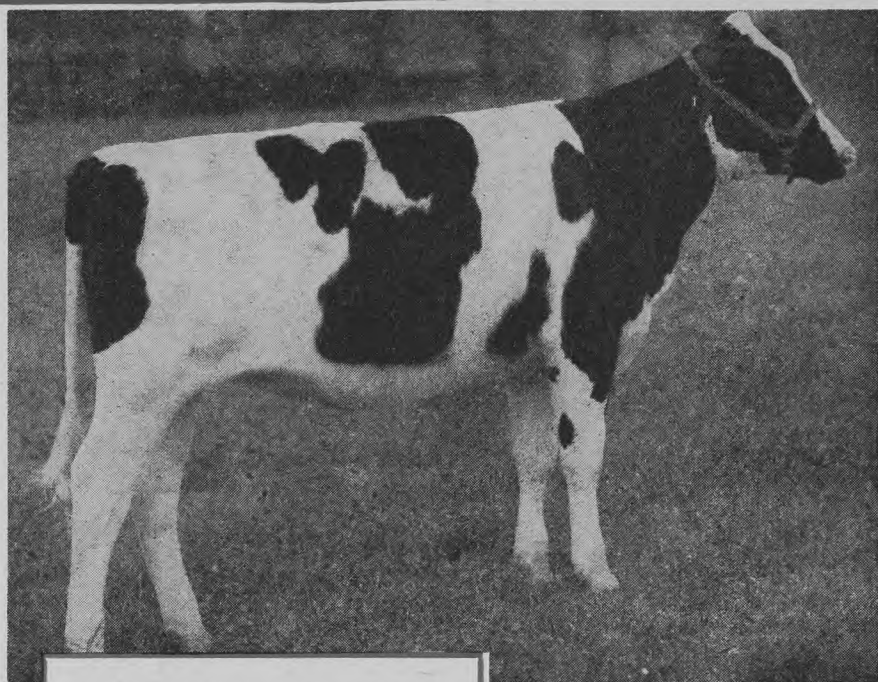
simply walk through to the other end and arrive on the same side of the fence. Hog psycho-analysts assure us the I.Q. of a hog is so low that he will never know that he is being tricked.

### Texas Gate or Auto Crossing

This is the most convenient means by which automobiles and trucks can pass into fenced yards, fields or pastures without the necessity of getting out to open and close gates.

The opening in the fence should be about 10 feet wide to provide ample room for wide trucks, as well as for cars. A pit 10x9 feet by 5 feet 8 inches is dug so that 4½ feet of the pit will be on each side of the fence line. Two sills 10x8 feet by 8 inches and four beams 9 feet by 8x8 inches are required. Each sill is set about 16 inches below the ground line, along the front and rear

# TOPS A CLASS OF 99!



### HER OWNER WRITES:

Winchester, Ont.,  
October 13, 1945.

Gentlemen:

My heifer calf, Willola Daisy Supreme, captured my second consecutive championship at the Central Canada Junior Exhibition at Kemptville in a class of 99 calves. Last year my Willola Betty Pathfinder, maternal sister of Daisy Supreme, topped the same class against 87 contestants. Both calves were raised on Quaker Ful-O-Pep Calf Meal.

Many stockmen remarked at Daisy Supreme's great size with no over-fitting. I like Quaker Ful-O-Pep Calf Meal because calves relish the feed and in turn do well. My calves show good development and enter the show ring carrying great bloom but no excessive fat.

(Signed) W. J. FAWCETT.

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ON FUL-O-PEP**



Willola Daisy Supreme, owned by W. J. Fawcett, Winchester, Ontario, a great champion of the Central Canada Junior Exhibition, Kemptville, tops an unprecedented class of 99 calves. She has been nominated All-Canadian.

### A CONSISTENT WINNER

In addition to her great feat at the Junior Exhibition, Willola Daisy Supreme has been a consistent winner at other shows.

First in a class of 34 calves at Eastern Ontario Championship Show, Kemptville.

First at South Mountain County Fair.

First in her class and Reserve Junior Champion at the Dundas County Black and White Day, Chesterville.

All-Canadian Holstein Heifer calf.

### A Good Calf—Well Fed

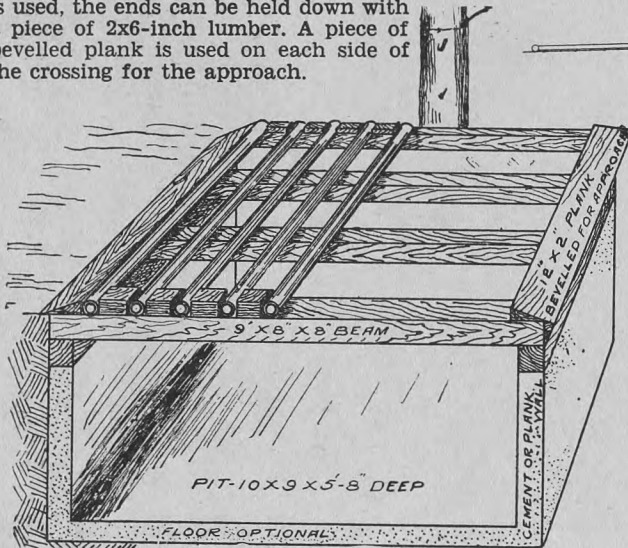
Yes, it takes both feeding and breeding to make a champion. Big, sturdy, well-grown calves are produced by feeding Quaker Ful-O-Pep Calf Meal.

Calves relish Quaker Ful-O-Pep Calf

Meal and eat it readily when only a week old. And remember—one pound of Quaker Ful-O-Pep Calf Meal takes the place of ten pounds of whole milk . . . saves you up to \$30 per calf. So be sure to consult your local Quaker Ful-O-Pep dealer and learn of all the many feeding advantages of Quaker Ful-O-Pep Calf Meal.

**FUL-O-PEP - The Feed of Champions!**

edges of the pit as shown in the sketch. The four beams are then set on the two sills and equally spaced. Either poles of about 4 inches diameter or  $2\frac{1}{2}$  to 3-inch pipe are then laid across the beams. The poles or pipe are then spaced 6 inches apart with pieces of 2x6 lumber. The 6-inch spacing is essential to prevent injury to the feet of all livestock should they attempt to cross. The poles can be nailed to the beams. When pipe is used, the ends can be held down with a piece of 2x6-inch lumber. A piece of bevelled plank is used on each side of the crossing for the approach.

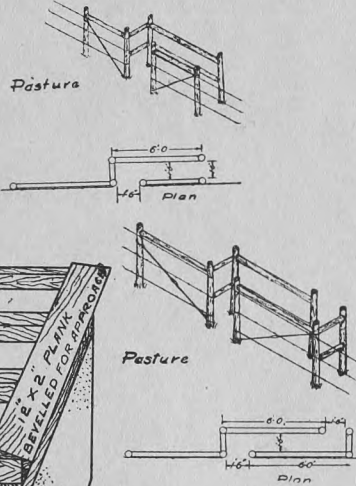


### P.F.R.A. Squeeze Gate

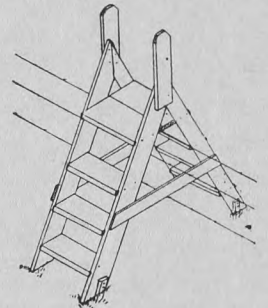
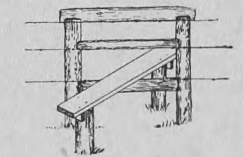
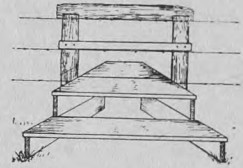
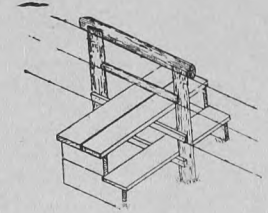
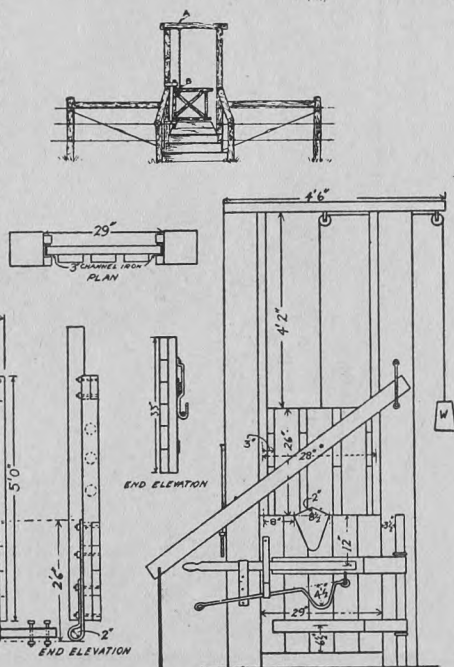
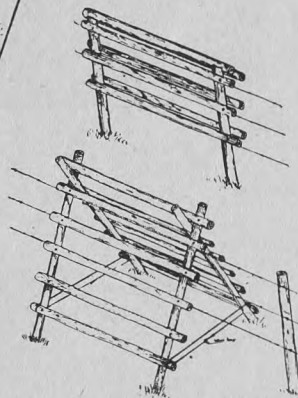
This squeeze gate was designed for use in community pastures but will be found equally convenient on the ranch or stock farm. The dimensions are given in the sketch. At the left is a side view of the structure. The side hinges on a piece of 2-inch pipe, as is shown in the sketch. The animal is driven in and the side squeezed in by rope and pulley. At the right is shown the head gates, between the front two posts. The lower one is hinged and the upper one slides up and down. A separate small cut shows the "plan" of the upper gate as viewed from above. The lower gate is notched at the top and the upper one at the bottom to take the animal's neck. The small sketch called "end elevation" shows how the strong piece of strap iron is fashioned to loop over the fastener, with a hook at the bottom to take the iron which clamps over the animal's nose. This strap iron is bolted to the

outside upright of the swinging gate. A weight balances the sliding gate.

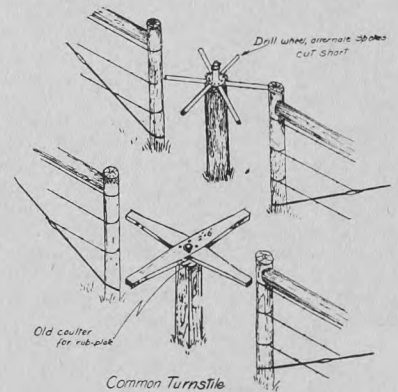
### People-Preferred Gaps



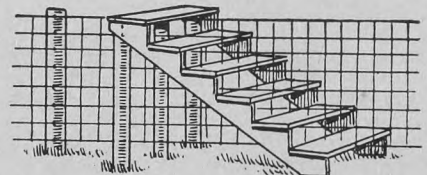
### Designs for Stiles



### Two Designs of Turnstiles



### Stile for Wire Fence



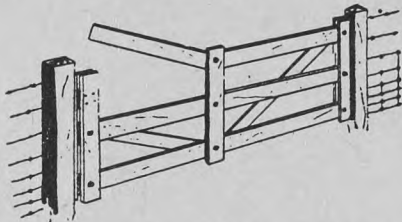
This plan provides for building the steps right into a wire fence. The top step rests on a fence post and a post is



set under each end of the top step. The stringers are put in place and the remaining steps are slipped through between the wires. If any of the upright wires are in the way they may be cut to let the step in. The horizontal wires should not, of course, be cut.—Mrs. Dan Harris, Edgeworth, Sask.

### Helps Climb Gate

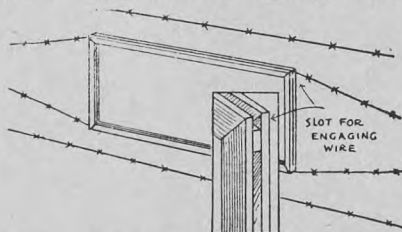
Here is a plan to keep small livestock and hogs from following me through an open gate. The top section is in two parts, hinged at the middle on a bolt, so it can be raised while



stepping over and then dropped back into place. When down, the movable part rests on a block in the end upright of the gate at the latch. When the gate has five boards the top two could be fastened together and hinged in the same way.—I.W.D.

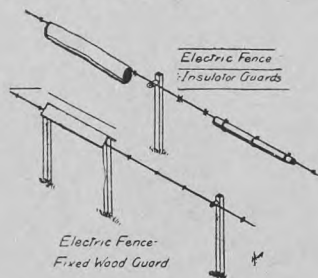
### Loophole in Fence

Popular Mechanics must have received this idea from a prairie farmer who knows what it feels like to get his overalls caught on barbed wire. It is a double frame, which slips in between two strands of the wire and through which



the passage can be made from one enclosure to the next without engaging the barbs. One precaution seems necessary. It should not be placed opposite any tempting mouthful of green feed or the old cow, reaching for it, and finding she was also protected, might put on enough strain to wreck the fence.

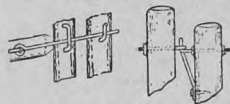
### Guards for Electric Fence



A piece of old rubber inner tube, a piece of split rubber hose, or a wood

guard is useful to protect a person from electric shock when stepping over an electric fence. These can be placed where most frequent crossings are necessary. Gates of any kind are not then required and the circuit of electric current in the entire fence is less likely to be impaired or completely broken. When part of the electrically charged wire is disconnected to provide access, it is sometimes left on the ground and short-circuited.

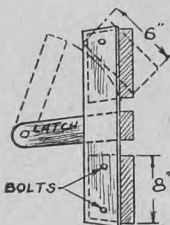
### A Latch and a Hinge



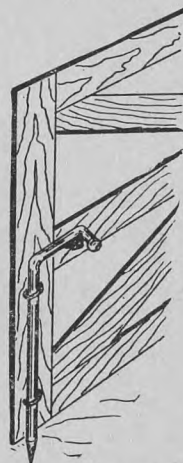
This shows the design for a latch and a hinge made out of common round iron. Where the hinge iron passes through the post good large washers should be used as they have to carry the weight of the gate.

### Barnyard Gate Fastener

Here is a gate fastener which will prevent livestock from opening a gate. The locking device and latch can be made of either wood or iron. A pivoted block in the top of the locking device can be moved to permit the latch to drop into a slot and the pivoted block is allowed to swing back to prevent the latch from being lifted.



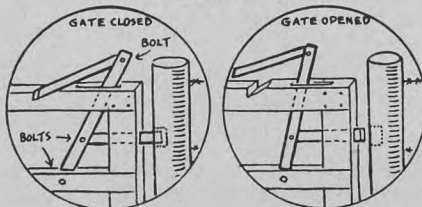
### A Gate Anchor



to hold the drawbolt off the ground when not in use.

Gates that will not stay open when required are frequently a nuisance. A simple drawbolt type of anchor can be fastened to a gate as shown. A piece of  $\frac{5}{8}$  round iron for the drawbolt is made sharp at the end, which is to contact the ground or floor. The opposite end is bent to form a suitable handle. Two eyebolts or "U" bolts serve as suitable guides for the drawbolt. An ordinary carriage bolt serves

### Horseback Girl's Gate



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# CRANE

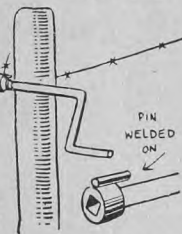
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### Car Crank Tightens Wire

An emergency fence wire tightener was made from an old auto crank of single piece construction. It proved so satisfactory that it is still being used for barbed and smooth wire in place of a regular wire stretcher. To make it into the stretcher, a short pin was welded to the starting end as shown. The crank is then put up against the side of the post after the wire has been engaged under the pin and while the crank is held in place with one hand it is turned with the other, thus exerting easily a 15 to 1 leverage which is maintained as long as the crank is turned. Then the wire is stapled and the surplus unwound. The crank works as well also for taking slack out of a barbed-wire fence.—Dale Van Horn.



### Gathering Barb Wire

Having to move some barb wire which had been used in a fence that ran through a long stretch of heavy willows, and needing it on another fence some distance away, I wondered how to move it. It would have meant a lot of work to clear a trail near the wire to roll it up and on account of the route I had to take I could not very well haul it to the new place with a team. So here is what I did and it worked just fine.

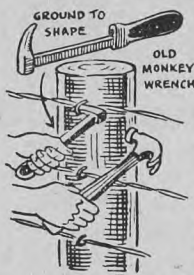
I took the tractor, one that has lugs on each side of the wheel, and after jacking one wheel up, I passed one end of the wire through the rim and then fastened it to a spoke. Then putting the motor in reverse gear I idled it very slowly and let the clutch in gently. The wire was soon wrapped around the wheel. My 15-30 rods of regular gauge barb wire on each hind wheel.

After winding the wire on the wheel I took the free end and ran it through a hole in the rim and then around another spoke. Putting the tractor in high gear, after taking out the jack, I was soon where I wanted to use the wire on the new fence. Putting the end of the top wire around the corner post and securing it, all I had to do was to drive down beside the new fence and there was the wire all ready to put on.

On hard ground, when the wire is mostly all unwound off the wheel, the lugs make the circumference of the wheel greater than the circumference of the wire on the wheel and you must back up off the wire and unwrap one round of the wire or else it will break. Have someone stand on the loose wire

till it tightens up some. This is the quickest and easiest way I have ever moved barbed wire.

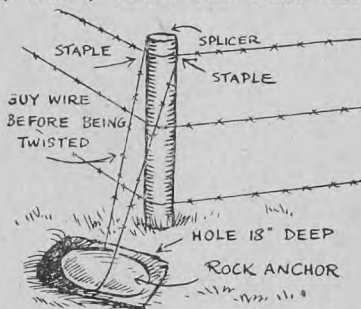
### Staple Puller from Old Wrench



Only a few minutes time is necessary to convert an old monkey wrench into an efficient staple puller. The lower jaw of the wrench is removed and the upper jaw rounded on a grindstone or emery wheel. The sharp point is driven into the staple with a hammer as shown and a little pressure on the wrench handle starts the staple moving out of the post.

### Anchoring Corner Post

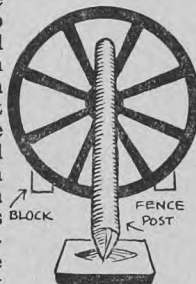
As an old rancher, I have built many miles of fence and have tried all methods of anchoring corner posts. By experience I have found that the simplest, safest, surest and most lasting



method is a piece of wire and a rock anchor, or "deadman" as it is called. The sketch illustrates the method.

### For Sharpening Fence Posts

Here is a plan for holding fence posts while sharpening them. You stand the post with one end between two spokes of the hind wheel of a wagon which has been blocked so that it will not move. The end to be sharpened rests on a block on the ground in which a depression has been cut. This arrangement can be used to sharpen any sized post and all you have to move about the farmyard is the block.—Sam Phillips, Cabana, Sask.



### Sheep Proof Fence

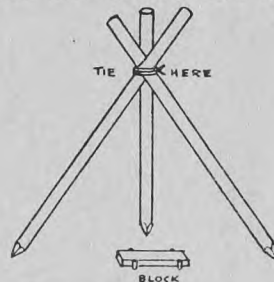
To keep sheep in a cattle or horse pasture I drove stakes into the ground about a foot and a half away from the post and right across from it on the outside of the fence and filled in be-

tween with untrimmed poplar trees about 20 feet long.

By putting each succeeding tree about three feet further along the fence than the one before it in the manner of a stake and rider fence a man can fence quite a bit in a day. The branches act as stakes and the weight of the tree forces the brush down till it is soon a sheep proof wall.—T. C. Hazell, Nampa, Alta.

### Tripod for Sharpening Posts

When it comes to sharpening fence posts the work is simplified by tying



three posts together so as to make a tripod. One end of the post to be sharpened is placed against the tripod and the other rests on a block which is held in position by four stakes. Then both hands are free to wield the axe.—Wm. Pikula, Amsterdam, Sask.

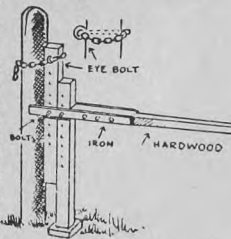
### Driving Small Stakes

Small stakes that cannot be pushed into the ground and are too slim to stand pounding on the top without splintering can be driven with a hammer if this little contrivance is made. Simply notch a piece of hardwood as shown and anchor it to the stake with a piece of stout rope as indicated. It can then be driven into the ground as far as desired.



### Handpower Post Lifter

This jack will lift a post without the trouble of using horses. The two uprights have holes bored in them at intervals so that they can be adjusted for any height. Through the one next the post to be lifted there is an eye bolt. A short piece of chain goes round the upright, through the eye of the bolt and around the post. It is then a simple matter of lifting by pumping on the handle, getting a new catch with the chain every time the handle is lifted.

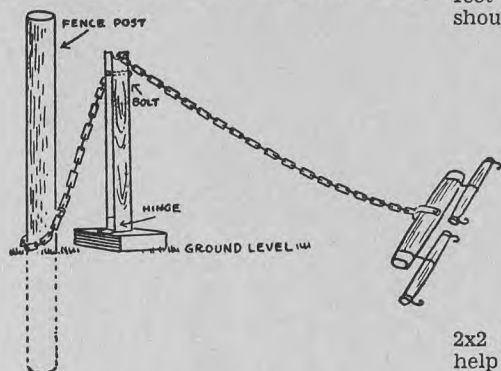


### Post Puller

This post puller is made by taking a piece of heavy plank a foot square and a bit of hardwood about three feet long.



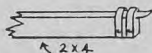
The stick is fastened to the plank with a strong hinge. The stick is notched at the top and a bolt put through to keep it from splitting. Fasten the chain to the post just above the ground and pass it over the upright in the notch. Then



drive ahead.—Stewart A. Glauser, Delisle, Sask.

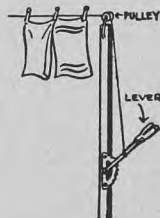
### For Removing Fence Posts

Please find enclosed a sketch of a post jack of my own construction which will help many farmers in the problem of pulling out posts which must be replaced by new ones or removed to another location. With this jack two men can pull out from 75 to 100 posts per hour. It is very simple to make and inexpensive. All it takes is a piece 2x4 by 8½ feet long, two pieces 2x4 by 2 feet long, a piece of 1x4 for bracing, an old mower guard, a bolt ¾-inches by 6½ inches, two 6-inch clevises, two ½-inch bolts 3 inches long, one 4-inch spike and a few 2½-inch nails.



The frame and lever are assembled as shown in the drawing. A hole for the large bolt is bored 18 inches from the working end of the lever. One man does the jacking by setting the jack the proper distance from the post and poking the end of the mower guard into the post about 24 inches above the ground and prying up the post while the other man pushes the post against the guard. With a little practice you will master the use of this jack.

### Non-sag Clothes Line

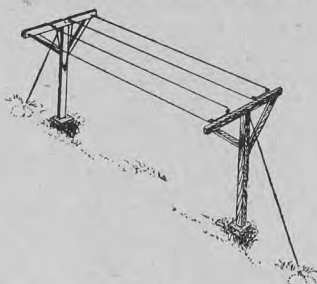


There are innumerable ways to keep a clothes line from sagging, and here is one of them. A lever from an old farm machine is used to apply the pressure. The end of the line is attached to it and then runs up over a pulley in the top of the post. Now, says

someone, why didn't I think of that before?

### Four Line Clothesline

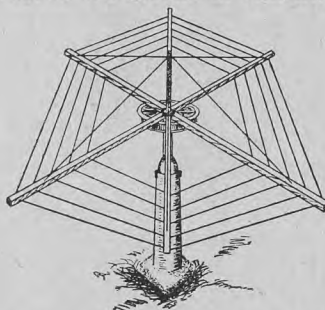
Two 8x8-inch or 6x6-inch posts are treated at the bottom with either creosote or bluestone to prevent decay. The posts are best set in cement about three feet deep. The top part of the cement should be in the form of a cap about



2x2 feet x 6 inches thick. This will help to keep the posts from leaning and prevent unsightly weeds growing around the base. The cross arms are 6 feet x 2x6 inches and braced with 1½x3/16-inch strap iron. Six large sash or clothesline pulleys and two hooks or eye bolts are required for the four lines. The line is first passed around the pulleys and the two ends are then fastened to two hooks in one of the posts. All the lines are tightened by pulling on the centre two lines, which are fastened to a cleat on the post.—H.J.K.

### Outdoor Clothes Reel

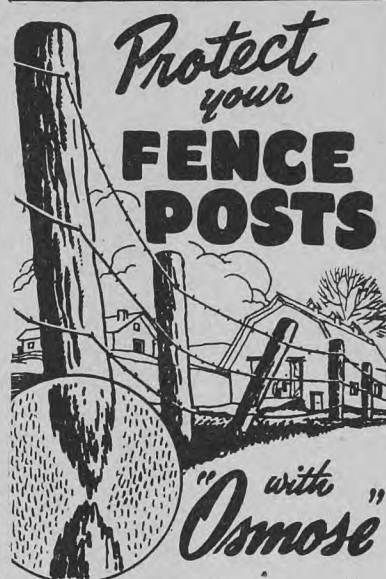
An automobile rear wheel and half the axle housing, supported by a heavy pole set in the ground in cement, pro-



vides the principal means for constructing a strong outdoor clothes reel. Six arms are made from six pieces of 2x4 inches x 6 feet long. These are bolted to the wheel. A piece of pipe about three feet long is welded over the end of the axle so that it projects above the wheel. The pipe serves as a support for stay wire or stay rods to support the six arms. Number nine smooth galvanized wire or ordinary clothesline wire can be used to provide four or five clothes lines.

### Clothes Line Reel

I had for some time been in need of a clothes reel and this is how I made one. Many farmers use the rims of the rear wheels of a tractor for making water troughs. I have one on our farm. Making the reel gave me a use for the hub and spokes. I used four poles 14 feet long and some No. 9 gauge wire. I bent four spokes down through the



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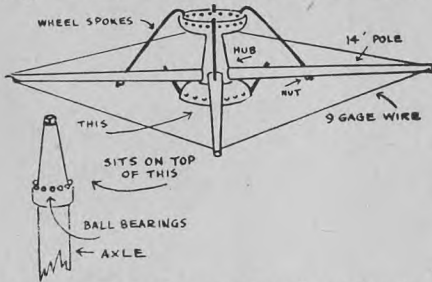
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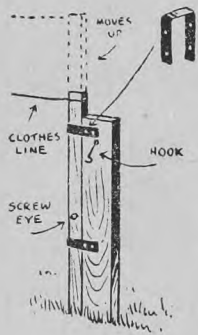
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poles and put a nut on the end of each spoke. I also placed a run of ball-bearings around the inner side of the axle,



thus making the reel much easier to turn. For people with a large washing another wire can be added.

### Adjustable Clothesline



A clothesline must be fairly low to hang the clothes on, but it often is a source of inconvenience when not in use. To make it adjustable in height it is fastened to two hardwood bars which slide up and down in U-shaped metal pieces. It is held up by an ordinary screw hook.—D. H. Edgeworth.

### Clothesline from Window

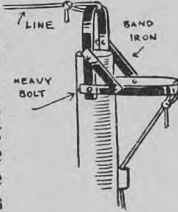
There is a telephone pole about 30 yards from my kitchen window. I attached a pulley on the pole and another on the side of the kitchen wall opposite from the pole, and ran the line through the upper half of the kitchen window. I have the window fixed so that I can raise and lower it very easily, and also have a stop lock on it to keep it in place when closed. The clothes can be

hung up in the kitchen and shoved out through the window.—N. Wynes, Kincaid, Sask.

### Clothesline Tightener

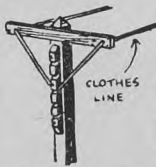
The clothesline has a disagreeable habit of sagging and it is quite a job to tighten it if some provision has not been made for doing it. In this case a tightener has been made from flat iron.

The iron should be 3-16 inch thick and an inch wide. A bow is made to go over the end of the post. This carries the line. Another bow carries a rope for tightening and the two bows are braced as shown. The tightening rope is fastened around a small piece of wood nailed on the post.



Another way to tighten a clothesline is to sink a short post behind the clothesline post, down to the level of the earth. An eye bolt or screw is fastened to this hidden post and a stay wire, doubled, is strung from the eye bolt to the top of the clothesline post. When the line begins to sag the stay wires are given an extra twist as is done in tightening the brace wires of a corner fence post.

### Another Clothes Line Tightener



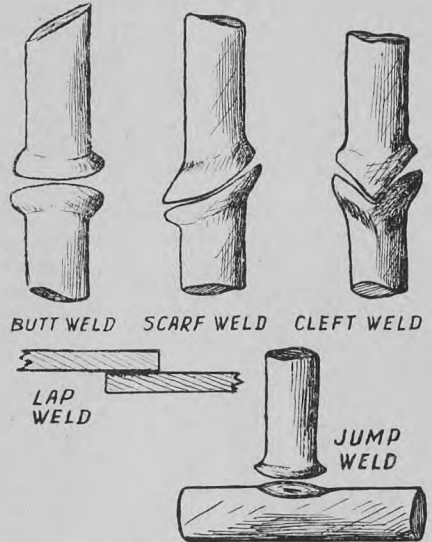
There is no end to the methods of keeping a clothes line taut and this is as simple a way as any. Notches in the strip may be bored with an auger or whittled. In either raising or lowering the line to the next notch a broom handle is used as a lever. Place it between the line and the post and pull toward you. In lieu of a strip you can use spikes or hooks.

### Forge Welding

The conventional blacksmith's forge, anvil, hammer, tongs and quenching pail or tank are the essential tools for forge welding. Special blacksmith's bituminous coal is most commonly used to supply heat. This is usually obtainable through any local coal dealer.

Welds are made in different ways. The five principal methods are:

1. Butt weld.
2. Scarf weld.
3. Cleft weld.
4. Lap weld.
5. Jump weld.



In order to supply enough metal to make a good weld, the ends to be welded are first made thicker as shown in the sketch. The parts are then heated again to white heat sufficient to cause the surfaces to melt. The ends are then hammered together.

The fire for welding should be fairly deep. A deep fire prevents too much air passing through the fire. This enables most of the oxygen to be consumed before it reaches the parts to be heated. Too much oxygen causes the metal to scale. Flux is used to coat the metal to exclude the air. The blower should supply air with a pressure of about one-quarter pound to the square inch.

Flux is not usually required for welding ordinary wrought iron, unless it is thin. Flux, however, is required for welding steel. A 50-50 mixture of borax and sand, plus about 25 per cent of iron filings is a satisfactory flux for steel. Good welding compounds can also be purchased. Steel is first heated to a yellow color. Then the flux is sprinkled on to the heated parts. The parts are then hammered together lightly for the first few blows, followed by heavier blows as soon as the two parts have stuck together.

Some practice is required to become efficient in welding. If one can obtain a few lessons from an experienced blacksmith, or from an agricultural engineering school, so much the better.

## SECTION 6.

# Work Bench and Machine Shop

## Welding

Great advances in mechanizing agriculture during the past few years have been made, and still greater progress is expected in the immediate future. As mechanization expands, the greater becomes the urge and need to acquire greater knowledge of its principles and practical applications. The art of welding, which was once reserved to the most skilled, is fast becoming commonplace on farms, equally at least to that of farm carpentry. Having a welding machine on a farm is certainly of great advantage. Much time for repairing can be saved and more home-made labour saving equipment may be made, and more can be devised by the ingenious farmer himself.

## Methods of Welding

There are several methods of welding. Those which are most adaptable for farm use are:

1. Forge welding.
2. Oxy-acetylene welding.
3. Electric arc welding.

**Forge welding**—This is the familiar blacksmith method by which pieces of metal are heated to melting point and then immediately forced together by means of hammering.

**Oxy-acetylene welding**—Metal is heated to melting or fusion temperature by an intensely hot flame. This very hot flame is created by the ignition of a controlled mixture of two gases, namely, oxygen and acetylene. No pressure is used to unite the heated metal. The molten metal is allowed to run together and solidify.



### Oxy-Acetylene Welding

The oxy-acetylene torch can be used for welding many kinds of metals. It is usually more suitable for commercial work, or where electric power service is not available.

An oxy-acetylene welding outfit consists of an oxygen tank, an acetylene tank and a torch. The torch is equipped with a handle, a tube for the oxygen, another tube for the acetylene. A needle valve is used to control the flow of each of the two gases. A head and tip unite the gases to form the desired arc. Oxygen is supplied to the torch at somewhat higher pressure than the acetylene. The pressure of both gases is controlled by regular valves on the tanks. Various size tips, together with the controlled pressure of both gases, determine the size and shape of the arc and the intensity of the heat.

The thickness of the metal to be welded determines the size of tip to be used. The construction and types of nozzles vary. Some are straight, while others are bent. Manufacturers supply various sizes of tips. Charts are also supplied by manufacturers indicating the proper sizes of tips, welding rods, etc., to be used for welding various kinds of metals. The beginner is advised to start to learn welding with strips of wrought iron or steel about 1/4-inch thick. Welding rod of filler metal is not usually required for this light work. As proficiency is attained, thicker metals may be welded using filler metal. When welding, the torch is moved across the joint in semi-circular or zig-zag motion. This tends to avoid overheating and at the same time causes the metal to flow together. The edges of thin metal of 1/8-inch, or less, are made square preparatory to welding. Edges of thicker metal up to 3/8 inches in thickness should be levelled on one side at about 45 per cent to a depth of 1/4-inch. Metal, which is 1/2-inch or more thicker, is preferably levelled on both sides.

**Welding Rods**—Generally speaking, the welding rod should be of the same kind of metal as the parts to be welded. When welding metals of two different kinds with different melting points, the welding rod should have a melting point equal to that of the lower.

**Welding Cast Iron**—Cast iron should be pre-heated to cherry red before welding. The pre-heated area should extend to a considerable distance on each side of the joint. As soon as the metal is cherry red, apply a little scaling powder. As soon as the metal begins to run, the cast iron welding rod should be applied.

**Welding Steel**—A mild steel welding rod is used for welding steel of more than 1/8-inch in thickness. The edges of the steel parts are heated until they become fused together. As soon as the metal begins to run, the welding rod is used to apply more metal. Flux is not required for low carbon steel. Flux or welding compound is required for the higher carbon steel to prevent oxidation.

As the art of welding has become more than simply melting or fusing metals together, it is advisable for the

beginner to become more acquainted with the fundamentals of welding operations. Instruction from a local experienced, practical welder, or through some of the University Farm Short Course Schools during the winter months, will reward those who are especially anxious to become efficient.

### Electric Arc Welding

Metal is heated and fused together by means of the heat liberated by an electric arc. The arc is formed between the end of a metallic or carbon rod and the metal parts to be welded. The metallic rod or electrode supplies additional metal to the parts being fused together, as well as being used to create the electric arc. Carbon rods are used to create the electric arc only, and additional metal is supplied by means of a separate welding rod similar in some respects to oxy-acetylene welding.

Electric arc welding outfits are of two main general types. These are classified according to the kind of electric current used, namely:

1. Alternating current.
2. Direct current.

The alternating current type uses an A.C. current from an electric power service line, and is equipped with a transformer for supplying electric current for welding. The direct current type consists of a direct current generator driven by either an electric motor or a gas engine. Its chief advantage is that it can be made portable for use in the field when it is powered with a gas engine.

The transformer type is considered most desirable for farm use where an electric power service is available. It is less expensive and has sufficient capacity to meet most of the farm requirements. The electric power line service must have sufficient voltage and a suitable size service transformer to equal the total load of all electric farm power and lighting.

A 250 ampere welder, together with the average farm electric light and power load, requires a service transformer with 5 to 10 K.V.A. capacity. If, in addition to the above, there are some of the large electric appliances, such as electric stove, refrigerator and hot water heater, then a 15 K.V.A. service transformer may be required. The ordinary light and small domestic electric appliances require a 1 1/2 to 5 K.V.A. Before installing any large electric equipment, the company which furnishes the electric power supply should be consulted.

**Capacity** — The minimum amperage capacity of electric welders for average farm repair work is 200 amps. This capacity requires a 220 voltage service. Welding outfits of this size create a heavy demand on a rural electric power line, especially if used continuously for a considerable period of time. Some welders are now equipped with a power factor correction unit, which reduces this demand. Most farm electric power lines are single phase, which consists of two lines. The three phase supply con-

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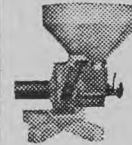
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sists of three wires. The single phase line limits the load that can be carried without too much interference with lights and other electric farm equipment.

**Masks, Goggles and Gloves**—The electric rays from electric welding arcs are dangerous. Eyes and skin are especially susceptible to the irritating effects of electric rays. Special masks, goggles and gloves for welding requirements can be purchased. Never attempt to do any welding, even for a very short time without protecting the eyes, face, hands and arms.

**Process of Electric Arc Welding**—Metals are fused together by means of an electric arc. The electric arc is created by placing an electrode in contact with the metal and then moving it away from the metal at a very short distance. The heat of the arc thus created varies from 6,300 to 7,200 degrees Fahrenheit. This intense heat causes metals to melt or become fused together. In actual practice one wire of an electric circuit is attached to the part to be welded by means of a clamp. The other wire is connected to a hand clamp, which holds an electrode or welding rod. When the electric current passes across a small gap between the end of the electrode or welding rod and the metal parts to be welded, the electric arc thus created melts the metals so that they run together and become fused.

The electric arc current required to fuse metals varies with the different kinds of metals and thicknesses. Expansion and contraction of different metals also vary. Uniting two different kinds of metal or two metals of different thicknesses becomes a more complicated problem that requires more skill.

**Different Methods of Electric Welding**—There are many methods of welding metals, depending largely on size or thickness, shape and kind of metal to be joined. Special welding machines are required for certain methods, as for instance "spot welding." The method most likely to be used on a farm can be classed as "butt welding." This method is used when two pieces of metal of the same thickness are to be joined together end to end. Similarly broken castings may be welded together. The parts are held in position by means of electrode clamps so that they may become fused together as the current passes through.

#### Metals Welded by the Electric Arc

Wrought iron, low carbon steel and steel castings can be welded with the electric arc. A great deal of the above metals are used for constructing farm equipment. Cast iron is more difficult to weld. Pre-heating is often necessary to prevent cracking by contraction in cooling. Brass, bronze and aluminum are more difficult to weld.

**Welding Rods**—Mild steel rods or electrodes are suitable for welding wrought iron, low and high carbon steel and occasionally malleable cast iron. Copper-aluminum-iron electrodes are most suitable for brazing cast iron and malleable iron.

The size of welding rods varies in diameter. They may be obtained from 1/16-inch up to 1/4-inch. The size of welding rod to use depends on the kind of work to be done and the amount of current used. Manufacturers of welding outfits and rods supply a chart or table which indicates size and kind of electrodes and the voltage and amperage of electric current for welding various metals.

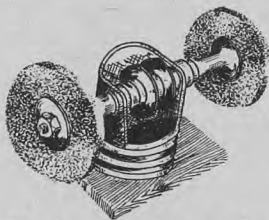
Some welding rods are coated to prevent the air contacting the molten metal in order to effect a better weld.

Carbon electrodes are used for heavy, thick welding jobs where it is necessary to heat large surfaces and melt considerable metal and filling in large gaps in castings.

**For Beginners**—Any young farmer, with average mechanical ability and a desire to learn, can become efficient in electric arc welding for most farm needs. If a special course in welding can be obtainable by attending a farm mechanic short course as sponsored by some commercial companies, the beginner is more certain of obtaining more skill than if he attempted to acquire knowledge by himself. Accidents are more frequent where beginners attempt to acquire knowledge entirely by their own efforts. It requires considerable time to become familiar with the essential principles of welding. Knowledge and experience are best obtained systematically and in progressive steps. This means that the beginner should start learning with simple jobs of welding. More difficult jobs can be attempted as skill is obtained.

#### Old Piston for Grinder

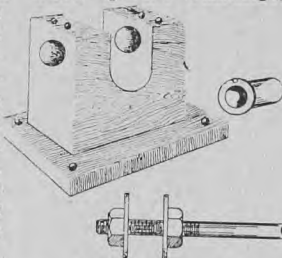
Old pistons have long been useful to many home workshop enthusiasts in providing a ready made bearing and base assembly, such as shown in the sketch. One or two holes are drilled in the head so that it can be bolted to a base or bench. The side of the piston is cut away, as shown, to provide access for the drive belt to a 2 or 2 1/2-inch "V" pulley. The drive shaft must be of the same diameter as the bearings. The ends are machined down to suit the size of



the holes in the emery wheels and threaded. One end should have a right-hand thread and the opposite end a lefthand thread. Hexagon steel nuts and washers hold the emery wheel on the shaft. A local machine shop or garage can machine a piece of round cold rolled steel to make the shaft at little cost, since it is a simple operation. Washers or spacers made of metal tubing or pipe are placed between the "V" pulley and the bearings to eliminate end play.

#### Grinder—Wood Block Frame

A block of hardwood is the special feature of this easily made bench grinder. The block is 6x4 1/2 x 3 inches when planed and finished. It is cut to shape and two 11/16-inch holes bored for Model "T" Ford spindle bushings, as shown in the sketch. A 9x6x 3/4-inch hardwood base is glued and screwed on the bottom. Oil holes are drilled at the top after

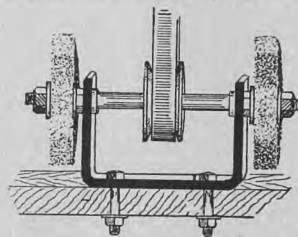


the bushings are set in the block. A slot in the flange of the bushing, together with a roundhead wood screw fastened

to the block, will keep the bushings from turning. The shaft is made from an 11-inch length of 1/2-inch cold rolled shafting. About two inches of each end of the shaft is threaded and the emery wheels are kept tight by means of a washer and nut on each side of the wheel. End play is taken up by means of washers. The 2-inch "V" pulley is purchased at most hardware stores at very reasonable cost.—H.J.K.

#### Grinder with Self-aligning Bearings

A simple bench grinder for sharpening small tools can be made with easily replaceable self-aligning bearings



mounted on an iron "U" shaped bracket. The bracket should be made of 3x3/8-inch flat iron. A piece of old wagon tire will serve the purpose. An 11/16-in. hole is drilled close to the top of each bracket arm to fit a Model "T" Ford spindle bushing. Care should be taken to drill these holes exactly opposite each other. The bushings should not be tight in the hole so that they can be self-aligning. A small hole or slot in the flange of the bushing and a pin or screw in the bracket arm will prevent the bushing from turning in the bracket. The spindle is made from a piece of 1/2-inch steel shafting 12 inches long, about 2 inches of each end should be threaded. If a lefthand thread and nut for one end can be used so much the better, as then the grind stones can both be kept tight.

#### Pipe Fittings Grinder Stand

One-inch pipe fittings consisting of one "Tee," two short nipples and a flange are used to construct the stand.



These are connected as shown in the sketch. One nipple is used to connect the "Tee" to the flange. The other nipple is cut in halves. Each half is screwed into the "Tee" to provide short housing for bronze or brass bushings used for the shaft bearings. Discarded brass or bronze bushings of suitable size, from other machines or automobile parts, can usually be found for such a purpose. One bushing is inserted in the end of the halved nipples. A Zerk grease nipple is fitted on the top of the "Tee" for lubricating the shaft. The shaft should be about  $\frac{3}{4}$  inches in diameter or to fit the bushings. One end of the shaft is threaded and fitted with nuts and washers to hold the emery wheel. A  $2\frac{1}{2}$  or 3-inch "V" belt pulley is set-screwed on the opposite end with a wear washer between the hub of the pulley and the bearing. The pulley is adjusted on the shaft to take up any end play and is securely fastened with two safety set screws set at right angles to each other.

—H.J.K.

### Treadle for Emery Wheel

The old treadle power is better than hand crank power, since it leaves both hands free to do the work required. The handle of the crank may be removed. A piece of  $1\frac{1}{4} \times \frac{1}{4}$ -inch flat iron is fastened to crank with a bolt in place of the crank handle. The bottom end of the piece of flat iron is bent as shown in the sketch. A length of 1x3-inch hardwood is used for the treadle.

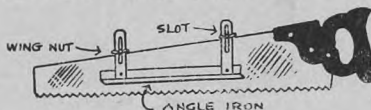
### Anvil Bench

A solid block of wood about 20 inches high and about 12x16 inches square makes the most suitable support for a blacksmith's anvil. Such large pieces of timber are not readily obtainable in treeless areas. A solid bench can be built up with 2x6-inch lumber for legs and cross braces. A piece of 2x12-inch plank, with corners cut out to fit the legs, is used for the top. Pockets and racks to hold tongs and other tools are provided as shown in the sketch. The height of the bench should be made to suit the user.

Usually it is from 20 to 24 inches high. The dimensions of the top are 12x20 inches.

### Saw Gauge

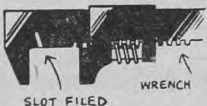
A handy gauge for a cross cut saw can be quickly and easily made with two short pieces of strap iron and a piece of light angle iron about 15 inches



long. Two small holes are drilled through the saw near the back edge. Small stove bolts with wing nuts hold it in position. The slots in the strap iron provide room for adjustment to any depth.—Paul Tremblay, St. Paul, Alta.

### Circular Saw Set

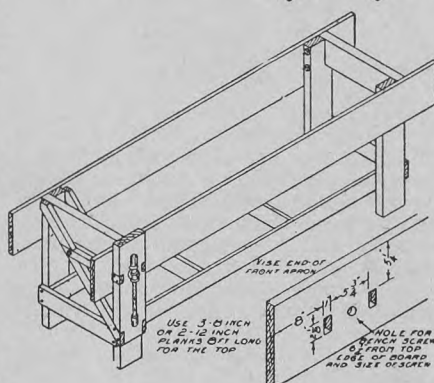
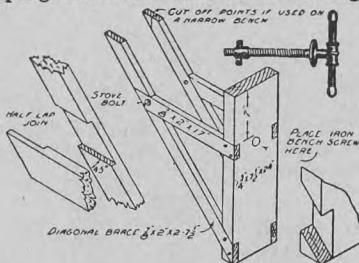
I made this circular saw set from an old Model T Ford iron monkey wrench.



A slot is filed between the jaws to fit over the saw tooth and the handle pressed down until the inner jaw hits against the blade of the saw. As this jaw is adjustable, any set can be put on the saw. The end of the wrench may have to be heated and tempered to make it tougher and prevent the slot from spreading. I have used this set for 15 years and find it works well.—Harry Cooper, Glenora, Man.

### Workbench and Wood Vise

WITH these drawings before him the farmer will have no difficulty in framing a workbench with a wood vise attached. The idea followed in constructing the wood vise is to have the outer jaw always perpendicular when gripping the work. The frame arrange-



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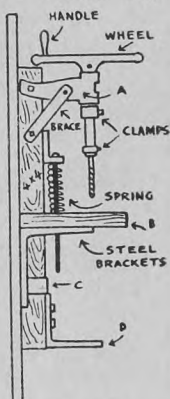
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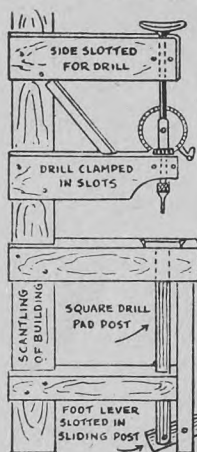
ment slides along under the bench top to accomplish this object. The iron screw normally is available in any good hardware store.

### A Bench Drill

This is a drill which I found very easy to construct. A casting from a plow coulter (A) is bolted to a 4x4 and held rigid by means of two steel braces. A shaft the size of the hole in the casting is drilled and keyed to a wheel. A clamp is fitted on below the casting, a small hole having been drilled in the shafting to afford a better grip for the set screw. A hole is drilled in the end of the shaft and another one into it from the side. Another clamp is then fitted to the shaft and a set screw fitted into this second hole holds the drill or bit in place. The 4x4 slides up and down, being held to the wall by the bench (B) and a steel strap iron (C) bolted to the wall. Pressure is obtained by putting weights on the steel bracket (D).—W. J. Loreburn, Sask.



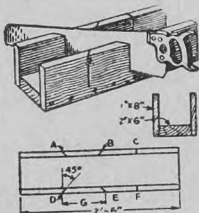
### Converted Breast Drill



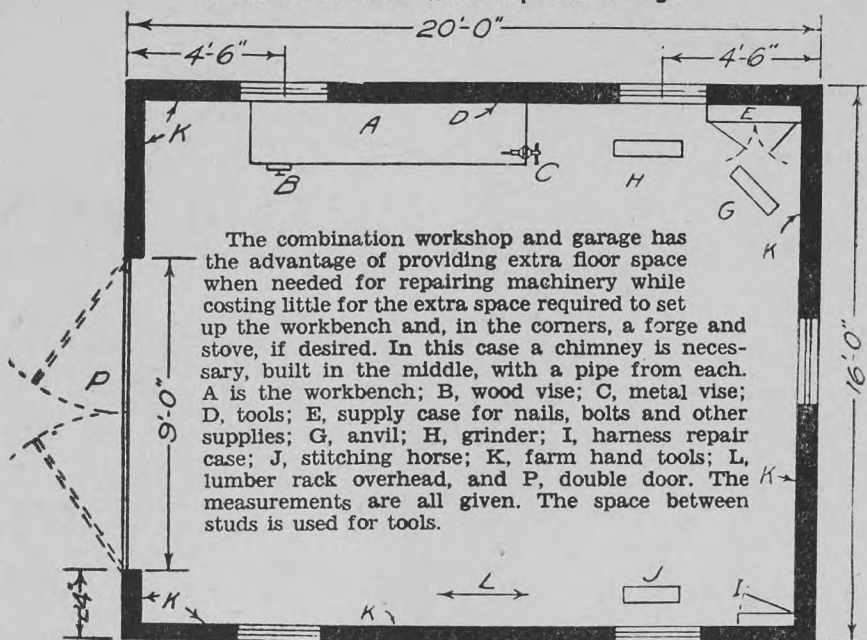
This is a light drill which I constructed and used many years ago. It will be noted that the drill is fixed rigidly in place and that the work is pushed up against it by the foot lever. The pressure is in line with the drilled hole. In drilling, say a 1/2-inch hole, first use a 1/4-inch drill then a 3/8-inch one and finish with one of the desired size.—John H. Foreman, Arden, Man.

### Miter Box is Easy to Make

On jobs of sawing small-sized lumber, molding, etc., where diagonal ends are desired, the best and quickest way to make accurate cuts is with a miter box. The figure shows a simple box that you can make in a short time, from a piece of 1x8 inch lumber 5 feet long cut in the centre to form the sides and a piece of 2x6 inch lumber 30 inches long to form the base. Assemble the box with wood screws, measure for cuts as shown and follow the marks carefully when sawing.



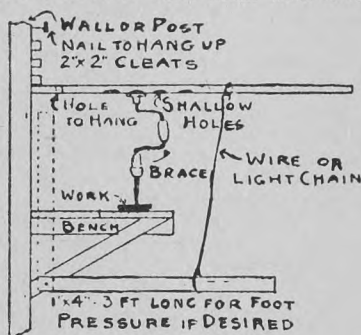
## Combination Farm Workshop and Garage



The combination workshop and garage has the advantage of providing extra floor space when needed for repairing machinery while costing little for the extra space required to set up the workbench and, in the corners, a forge and stove, if desired. In this case a chimney is necessary, built in the middle, with a pipe from each. A is the workbench; B, wood vise; C, metal vise; D, tools; E, supply case for nails, bolts and other supplies; G, anvil; H, grinder; I, harness repair case; J, stitching horse; K, farm hand tools; L, lumber rack overhead, and P, double door. The measurements are all given. The space between studs is used for tools.

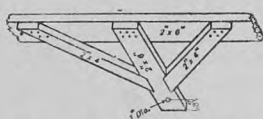
### Handy Shop Drill

An ordinary hand brace can be made to save a lot of labor in drilling holes in iron as shown. The easiest way to make the shallow holes to hold the round brace head is to burn them with a red-



hot iron door knob or large pipe cap. A good sized clamp is desirable to hold metal pieces for drilling.—I.W.D.

### Post Hangers and Drop Hangers



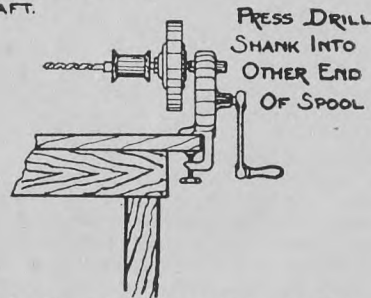
In putting a line shaft in the workshop you may need one or both of these two types of hangers. On the left is a drop hanger, which is fastened to an overhead joist. The main pieces are 2x6, while the braces are of 2x4 and are let in to the main piece. The hole is the size of the shaft and is three inches from the end.

The post hanger is attached, like a bracket, to a stud. Two pieces of 1x4

will do with the hole bored through them where they lap.

### High Speed Drill

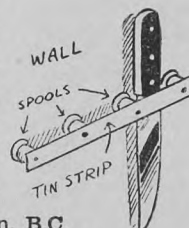
SCREW SPOOL ON  
END OF GRINDER  
SHAFT.



This shows how to convert an ordinary hand grinder into a high speed wood drill by using a common thread spool. Square one end of the spool hole by pressing the bit shank into it a short distance. Turn the opposite end on to the protruding threaded grinder shaft. This is especially useful to model makers and shops without electric power. While it would not be suitable for heavy work, it does give the high speed necessary for fine, smooth, accurate jobs.

### Knife Rack

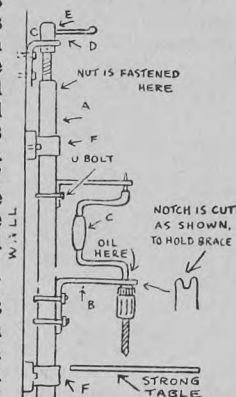
A knife rack can be made with four or five spools and a strip of tin a foot or so long. The nails hold the tin against the wall and the spools against the wall.—Leonard A. Atrill, Seaton Station, B.C.





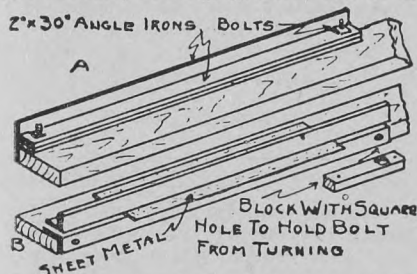
## Cheap Press Drill

All this press drill cost me was a thorough search of the junk pile and some careful work. The parts required are: A 3-foot length of 1½-inch pipe (A); a brace with the head removed (C); two pieces of heavy steel (B and D), which can be cut from the corners of an old plow frame; a screw and nut (E) with a sliding handle; and two guides (FF) to hold the pipe and allow it to slide up and down freely. The unit is bolted to a stout stud. The steel bar (D) must be made very secure.



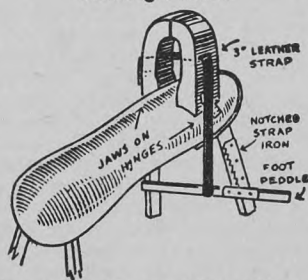
## Handy Sheet Metal Bender

This handy sheet metal clamp will be found very convenient for making square bends in sheet metal for use on self feeders, roofing, gutters, etc. It is



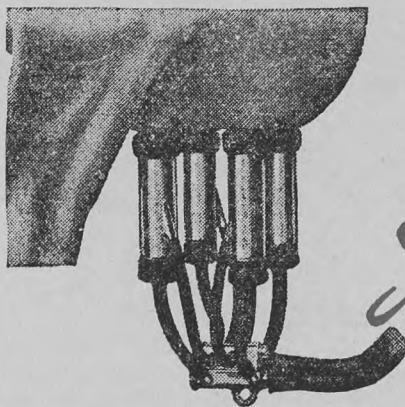
simply one two-inch angle iron, three to four feet long fastened on the edge of a somewhat longer 2x8 by heavy flat headed screws placed both in the top and edge of the board. A second two-inch angle operates on the first one by using two ½x3½ inch machine bolts with the heads below the board and covered with hardwood blocks with square depressions to keep the bolts from turning. The metal is placed as at B projecting to the line of the desired bend, and the nuts drawn down tight. The bend can then be easily made with the hammer or mallet.—I.W.D.

## Sewing Horse



This sewing horse will hold anything from a thin strap to a horse collar and it comes in very handy when getting the harness ready for work. The jaws

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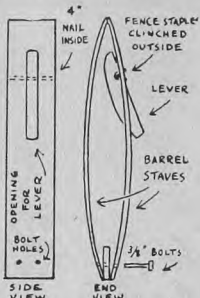
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are fastened on the block with hinges for a wide opening. A 3-inch strap is fastened to one jaw and passed through the other and down to the foot pedal which pulls the jaws together when pressed down. A notched piece of iron is fastened to the leg to hold the pedal. The diagram shows the seat made of a piece of log but it can also be made from a piece of good planking.

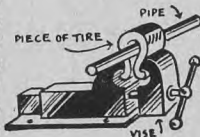
### Stitching Horse

This handy stitching device is made from two barrel staves. The two  $\frac{3}{8}$ -inch bolts at the bottom should be tightened until the staves fit tight on the 1x4 between, giving pressure on the jaws. In one stave there is a slot into which a lever is hinged. A 4-inch nail is fastened on with staples, forming a pivot. The lever spreads the jaws for inserting the work.



### Clamp for Thin-Wall Pipes

A clamp to be used with a vice for holding sheet metal pipes can be easily made by cutting a section out of an old tire and gripping it in the vise as shown. It will hold the delicate pipe without bending it out of shape.—A.F., B.C.



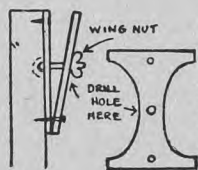
### Stitching Clamp for Harness

A stitching clamp for the repair of harness can be made from two barrel staves. When using the clamp hold it between the knees and your shoes. You will find that it is worth while to make such a holder even for a few jobs in harness sewing.—W. Kalbfleisch.



### Saw Vise

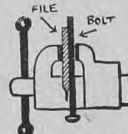
A simple but efficient saw vise can be made from the bridges of an old stove. Drill a hole a little above the centre in both sections. Fasten one to the post with a screw nail through the top hole, first inserting a bolt, the head of which is recessed in the post. Now put the second section on the bolt and fasten with a wing nut. Then fasten the two pieces to the post at the bottom with a long screw with a washer be-



tween. This brings the tops together tightly on the saw when the vise is tightened.—R. C. Willett, Cochin, Sask.

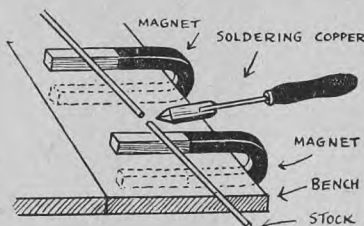
### For Smooth Jaw Vise

When the jaws of a vise become worn smooth a substantial hold may be secured on the work by inserting an old file between the work and the jaw. This is especially useful when burring the end of a hard bolt.



### A Handy Soldering Vise

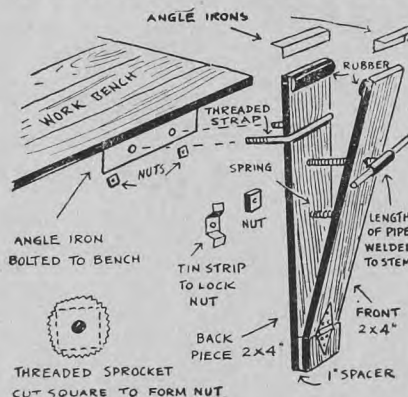
A pair of magnets will serve as a handy vise for holding small articles for



soldering. They will hold the articles to be soldered without absorbing the heat as is the case when using a heavy vise. They also prevent burning the work-bench when soldering is done directly on the wood. They will hold only steel or iron.—A. S. Wurz, jr., Rockyford, Alberta.

### Vise from Auto Jack

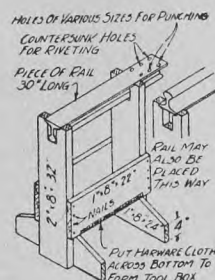
A vise for holding boards while planing and for general woodworking can be improvised from pieces of lumber and an old screw type auto jack. The jaws have a spacer between them at the bottom and the outer one is hinged as shown. The screw is received at the back by the sprocket, which has been squared to form a nut and is kept from turning by passing a piece of strap iron and nailing it down at both sides. A coiled spring pushes the jaws open. For fine work the strips of old rubber tire can be put on the jaws or short pieces of angle iron can be slipped over the ends when metal objects are being held. A



short piece of pipe is welded to the stem to receive the handle.

### Convenient Home-made Anvil

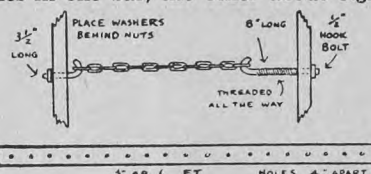
A short piece of railroad or street car rail, which can be bought very cheaply from section foremen or junk dealers, makes a very satisfactory farm anvil when mounted as shown. It is fine for straightening, flattening, bending either square or rounded shapes, punching, riveting, knocking off and replacing mower sections, etc. The method of mounting shown makes an outfit which



can be moved from place to place, or it can be mounted on a concrete base if preferred. The framework will be very much more rigid if the joints are brushed with waterproof glue before being put together.

### Clamp For Carpenter Work

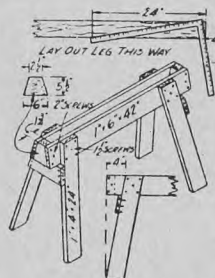
For this clamp use two pieces of 2x4 about five or six feet long. Bore holes four inches apart the full length of both pieces. Make four bolt hooks of half-inch iron, two of which are made just long enough to fasten through the holes in one bar, the other about eight



inches long and threaded most of their length. To connect the bars use six-foot trace chains, which can easily be adjusted to the depth of the work; but any kind can be used, even pieces of wire. Use washers under the nuts. Hardwood bars are best if you have them.

### Handy Open-top Sawhorse

No one can do efficient repair or construction work without at least two good sawhorses. Open-top sawhorses can easily be made out of scrap material around every shop, are light and easily handled, and are very convenient for the many repair jobs around the farm. The chief advantages of the open top are for ripping short boards and for holding a stick

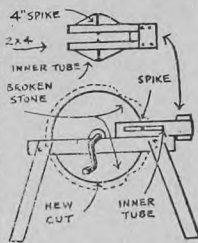


or a handle in a vertical position where a vise is not available. The sawhorse will be at least twice as strong and rigid if all joints are brushed with waterproof glue (which can be bought in any hardware store) just before they are put together; and will last much longer if given two coats of good paint. If intended for use with heavy timbers and poles, the legs should be 2x4's and the cross braces of 1x8-inch material.



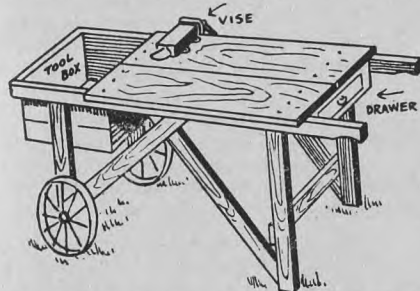
## Re-shaping Grindstone

If the grindstone has worn out of shape or has a piece broken out of it, take two pieces of 2x4 about 18 inches long, nail them together at one end with a piece of soft lumber leaving clearance enough for the grindstone to turn freely between them. Bore two small holes exactly opposite each other through the 2x4's as shown in the sketch so that they will be inside the broken part of the stone. The holes should be just large enough so that a 4-inch spike will pass through them freely. Then nail or wire the device on the frame with a 2x4 on each side of the stone. Put a 4-inch spike in each hole and over them tack pieces of inner tubing to give pressure. Start turning the grindstone without using water and soon the nails will shear off the stone to a true circle. — Daniel Harris, Edgeworth, Sask.



## Portable Workbench

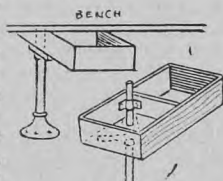
On the farm there is a lot of repair work that cannot be taken indoors to the workbench. The sketch shows a simple way of taking the workbench to the job. This portable workbench is sturdily constructed of old pieces of lumber and two old plow wheels or



other similar wheels that may be available. A box is built into one end to hold the necessary tools while a drawer to hold bolts, nails, screws, etc., may be placed at the other end if desired. The side rails extend at the end opposite the wheels to serve as handles when the bench is being moved. The whole structure should be rigidly built and the wheels must fit tightly to secure a firm surface. — J.A.S.

## Swinging Bench Drawer

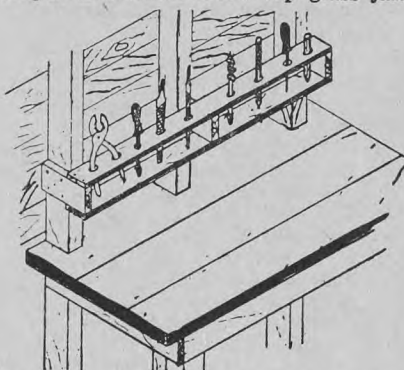
This style of a bench drawer, first published in a mechanics magazine, has many advantages. It can be swung completely out where the contents can be gotten at without difficulty and it is not in danger of dropping, as a drawer is when it is pulled too far



out. The support of the bench is part of an old axle housing. The hole in the bottom of the drawer must fit the support snugly and should be reinforced by an extra ply of lumber screwed on along with glue. The upper drawer support can be made of a piece of 2-inch stuff with the proper size of a hole bored through it and also fastened in place with screw nails and glue.

## Easily Made Tool Rack

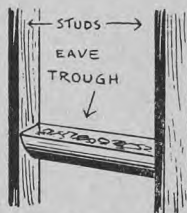
The diagram shows a handy rack on the work bench. It is made from two boards four inches wide and four feet long, nailed to three 1x2-inch spacers as shown, with holes of different sizes bored through the top board. This rack keeps the tools off the bench and available at all times. Drawers to hold small materials could be arranged under the lower board, or better still they could be put into small screw top glass jars,



with the caps fastened with nails or screws to the under side of the lower board. — I. W. Dickerson.

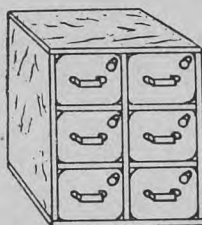
## Shelf for Small Parts

Lengths of eave trough, nailed between the studs of the garage or work shop provide convenient shelves for bolts, nuts or small parts. With the curved side of the trough outward it is easy to pick out the parts wanted. — Edwin Unger, Mayfair, Sask.



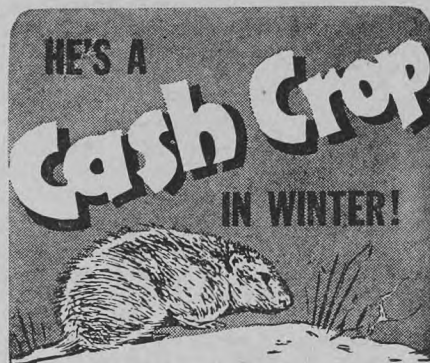
## Empty Oil Can Cabinet

OIL CAN WITH  
SIDE REMOVER



CONSTRUCT  
CASE TO FIT CANS  
AVAILABLE.

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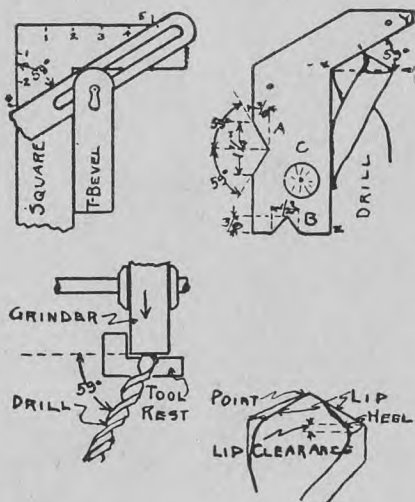
Address.....

cans for storing nails, screws, bolts, and other small articles about the shop and household. The top side is cut out and the cut edges turned in and hammered down flat to avoid danger of cutting the hands. The handles on the can are used for pulls.

### Sharpening Twist Drills

Straighten bent drills by tapping lightly with a hammer on a straight surface, as a bent drill does not bear equally on the lips and is likely to break.

Grind the two cutting lips of the same length and at an angle of 59 degrees, as shown in the diagram. Keep a cup of water handy and dip the drill frequently to prevent overheating and destroying the temper. The blade of the T-bevel set at five inches and three inches on the square as shown gives the proper angle of 59 degrees. If this is laid off on heavy sheet metal and a templet cut out, it will help the beginner very much in getting the proper shape to the drill point. Check one lip for shape and mark the centre point, and see that the other lip has the same angle and that the centre is on the

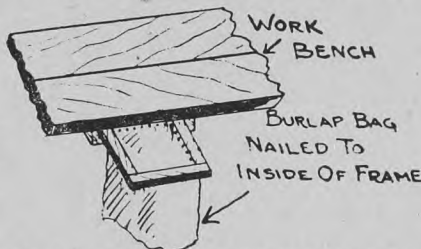


same mark. Clamping the templet to the tool rest with the edge XY parallel to the grinding surface and holding the drill along the line XZ will give the proper lip angle. The  $\frac{3}{8}$  by  $1\frac{1}{4}$  inch notch A on the side of the templet also gives the exact shape of the drill point. The  $\frac{3}{8}$  by  $\frac{1}{2}$  inch notch B gives the angle of 70 degrees for grinding a cold chisel for ordinary use.

Proper lip clearance, or the angle between the cutting lip and heel, is also very important to the proper operation of the drill. This should be about 10 or 12 degrees, but can best be checked by setting the drill point in the drilled countersink, and seeing that only the two cutting lips touch the templet, while the heels both clear slightly. The lip clearance angle should be rounded rather than straight, and is secured by holding the cutting lip to the grinder and then turning it slightly to the right.

### Bench Catch-all

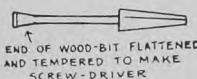
Here is a diagram of a handy catch-all under the work bench into which to brush sawdust, shavings, chips, and so



on. It is simply a frame made of three-eighths inch material tacked and glued together, with an old sack fastened on the inside. This slides in and out on cleats.—I.W.D.

### Screw-driver from Bit Shank

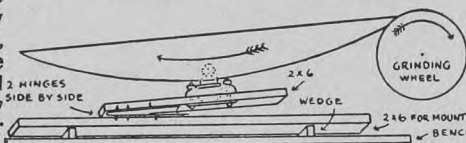
Most farm work shops have a wood bit which is done for. A good screw-driver can be made by cutting off the auger part, leaving only the round shank which can be ground to the proper shape with an emery. A screw-driver that is driven with a brace does its work much easier than the ordinary screw-driver. — Norman Yates, Grenfell, Sask.



### Sharpening Tiller Discs

This is how I built a very satisfactory device for sharpening my tiller discs. Do not place the pivot (disc bearing) directly behind the emery wheel, but about two inches toward the most convenient side. For mounting use a 2x6 or 2x8 and on this use a piece of 2x6 which is fastened to the mount by two hinges placed side by side. To this 2x6 an old ball race is securely fastened, and by means of a nut or collar to centre the disc, a concave washer and a tightener bolt and nut, the whole assembly is put together so that the weight falls on the grinder. This pressure may be regulated by moving the disc pivot closer to or farther from the hinges. I find that about six inches from the back of the hinges to the pivot about right for a 22-inch disc.

Put on the disc and tilt by means of the wedges until the edge lies flat on the centre of the grinder, and adjust until about half an inch is brightened when the disc is sharp. The grinding wheel will keep the disc revolving and there is no danger of it becoming over heated. The hinges allow an even pressure all



around. When the edge of the disc is ground down to about the thickness of the back of a thin table knife take disc off pivot, turn it over and finish from the inside by hand.

### Chisel for Cutting Drums

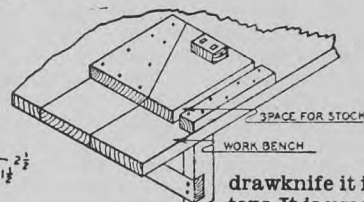


To make a chisel that will cut oil drums, take an old 12-inch file and shape it as shown. Make it a little thicker at the end than elsewhere to give it clearance. Heat to a dull red and cool in old oil.

This chisel will be found handy for cutting any thick sheet iron.—H. Fuller, McCreary, Man.

### Simple Bench Vise

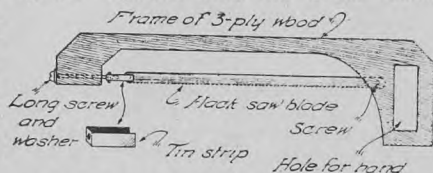
It is usual to nail a bit of inch stuff with a V-shaped notch in it on the work bench to hold stock while planing it. This device has that one beaten all hollow. For holding stuff while it is being planed or worked down with the



drawknife it is tops. It is used, of course, in addition to the ordinary vise on the side of the workbench.

### Wooden Hack Saw Frame

This frame is best made of ply wood as there is less danger of splitting. Two or three pieces of thin wood can be glued together and the same result



achieved. A long screw or stove bolt is used to put the tension on the blade. The proper length of the handle is worked out from the length of the blade. Be sure and have the clearance great enough to take any work which you may have to cut.—Dale Van Horn.

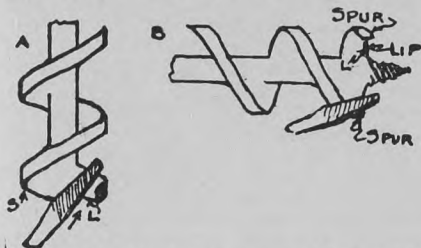
### How to Sharpen Auger Bits

Nearly all farmers have auger bits for boring in wood, but few know how to sharpen them so they will do good work. An auger bit has three working parts—the lips which cut the bottom of the hole; the spurs, which cut the sides of the hole; and the screw or threaded point, which forces the bit into the wood.

An auger bit file is the most convenient for sharpening, but a small taper



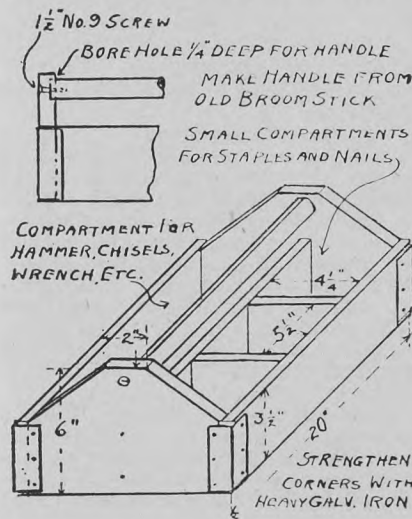
file works very well. The lip is sharpened by resting the point on a board and then filing only on the upper sur-



face of the lip. The spurs are sharpened by filing them on the inside only. Any filing on the outside will make the bit cut too small a hole and cause the twist to bind. If the screw is rusted or badly worn, the bit will work better if the threads are cleaned out and sharpened with a small taper file.

### Hand Box for Tools

In the old days carpenters used a hand basket for carrying the tools they needed on the job. A box is handier and can be made from stuff picked up around the place. The sides are best of thin material. For carpenters' tools it



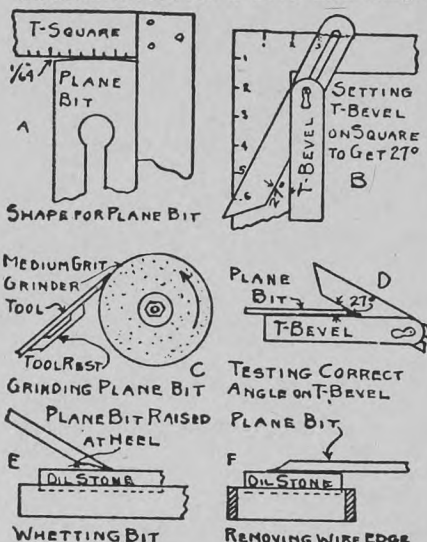
is best made long enough to take a saw though this is not absolutely necessary. The box shown is 20 inches over all, and has corners reinforced with sheet iron. The sides are 3 1/2 inches deep and the ends at the highest point six inches. The width is about 10 inches. One side is divided into compartments for nails and staples.—I.W.D.

### Homemade Cold Chisel

A cold chisel that may be used on rough work can be made from a discarded magneto. Heat the magneto in a forge and straighten it. Then reheat and bring one end to a blunt taper. Bury the iron in wood ashes so that it will cool slowly and then grind the tip to the regular chisel shape.

### Planes and Chisels

A smoothing plane bit should be at right angles to its length, but rounded about 1-64 inch at the corners to prevent ridges on the planed surface, as shown. Next set the T-bevel at an angle

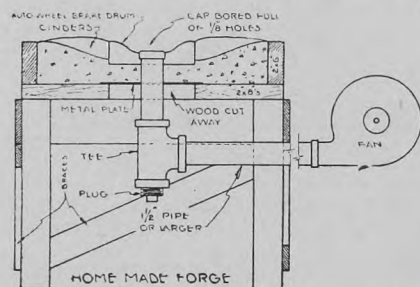


of 25 to 30 degrees, as shown at B, and grind the bit on a medium grit-grinding wheel. Test the angle with the T-bevel D until a slight wire edge can be felt. Dip the edge in water occasionally, as overheating as shown by a bluish color will ruin the temper. The bit should then be whetted on a good oil stone. lifting it slightly at the heel E so it touches for about 1-32 back from the edge. The bit should then be rubbed flat on the stone F to remove any remaining wire edge. A plane bit should be whetted several times before it needs re-grinding, and less sharpening will be needed if a scraper and brush are first used on boards to remove grit.

Chisels should be sharpened in exactly the same way as plane bits, except that the corners are not rounded.

### Homemade Forge

This homemade forge is recommended by the North Dakota Extension Service. A wooden bench with a two-inch top is built. A bull wheel from an old binder



with the spokes cut out, makes a good outer rim. Two-inch pipe would be none too large. A wooden fan speeded up with a wheel and belt can be put together. The illustration gives all the details that are necessary.

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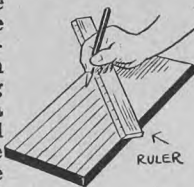
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## Board Divided Into Equal Spaces

Suppose you have a board five and one-half inches wide that you want to rip into eight strips of equal width. Of course, you can figure out the width of the strips mathematically, but there's a much easier way of doing the job. Just lay a ruler across the board at an angle, with the figure eight at one edge and the figure one at the other. The inch marks automatically divide the space into eight equal parts. Better keep this dividing trick in mind as you'll be sure to need it sooner or later in your shop work.



## A Lead Hammer

This lead hammer is very useful for pounding the threaded end of a bolt without damaging it. Take a piece of 1/2-inch round iron rod about 10 inches



long and bend one end of it as shown. Then take a piece of paper tubing about three inches long and 1 1/2 inches in diameter. Cut a hole on the side of it to take the handle and put the handle in place. Then fill up with melted lead; when it is cool strip off the paper and there you have your hammer.—Alex. Wilson, Star City, Sask.

## Fitting and Filing Farm Saws

To file a saw properly you must first have in mind the proper shape to which the teeth should be filed. The following instructions are taken in part, from a Cornell bulletin.

The first operation is not filing but jointing. To joint a handsaw or rip saw put it firmly in the saw clamp with the teeth up. Then take a small piece of three-quarter inch board, saw six inches long and two inches wide, and plane one edge until it is exactly at right angles to the side. Then take a flat file and hold it firmly on this edge. Hold the block against the side of the saw, with a file projecting out to cover the teeth and rub back and forward until they are brought to the same height. Do not file more than is absolutely necessary. It may take more than one jointing and filing to bring a badly used saw back into good condition.

The next operation is setting. For properly setting a saw, one of the saw-sets on the market should be used. Just set enough to give the blade nice clearance. It will require more set if it is to be used on wet or green lumber.

Fig. 1 shows the proper shape of the teeth of a rip saw. At the bottom is shown the set, which is here slightly exaggerated. The front or cutting faces of the teeth are at right angles to a line along the points of the teeth. This may be tested with a square as shown.

The proper position of the three-cornered file is also shown. The file is

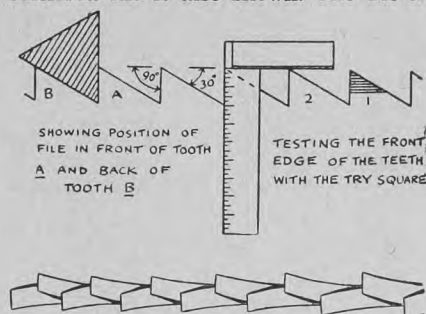


Fig. 1. Rip saw teeth, showing angles and cutting edges.

held level and straight across, at right angles to the saw blade. The file is pressed down into the gullet and files the front of one tooth and the back of the other at the same time. Be careful to put the pressure on so as to keep the points of the teeth evenly spaced. The teeth should all be the same size and shape. File all the teeth from the same side and work from the handle toward the small end of the saw. Each tooth is brought to a sharp edge as you go along; that is, the final touches are applied to the front side of each tooth.

Some file every other tooth from one side of the saw and then turn the saw around in the clamp and finish the rest from the other side. This has to be done with a handsaw, but is not necessary with a rip saw.

## Fitting a Handsaw

In fitting a handsaw, as it is generally called, though it is a crosscut handsaw,

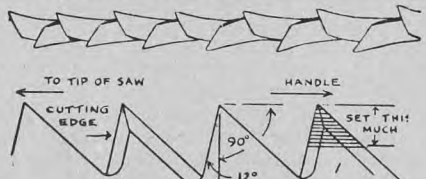


Fig. 2. Crosscut handsaw teeth, showing angles and cutting points.

It is first jointed and then set. The teeth are filed so that each alternate one cuts the grain of the wood on one side of the saw kerf, and the other one on the opposite side. They have therefore to be filed at a combination of

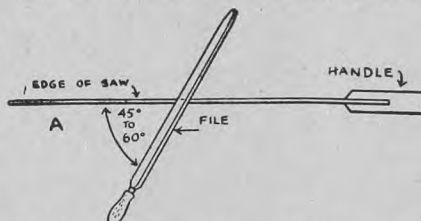


Fig. 3. Position of file across a crosscut saw.

angles. Fig. 2 shows these angles. Note that the handsaw tooth hasn't a cutting edge, like a rip saw, but a cutting point. Study closely the shape of the teeth in Fig. 2 and get a general idea of the angles.

The angle at which the file is held

across the saw blade is shown in Fig. 3. It is also held with the point higher than the handle. Half the teeth are filed from one side of the saw and the other half from the other. It is when doing the last half that each tooth is brought to the fine cutting point. Be careful as you go along to keep all the teeth as near as possible the same size. This takes care and practice.

If your saw has become badly out of condition with teeth of various sizes and gullets of various depth, Fig. 4 gives some hints on how to make the corrections. Of the four teeth shown, tooth No. 1 has just been touched up and is the right shape. Tooth No. 2 has been very much longer and much of the tip has been filed away in jointing, leaving a large, flat surface. Tooth No. 3, due to poor filing, has been left smaller than the others and No. 4 is larger than any of the others.

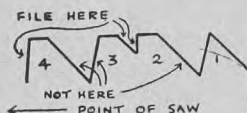


Fig. 4. Correcting the shape of the teeth of a poorly filed saw after jointing.

To file the teeth properly, No. 1 is left as it is, No. 2 is brought to a point by filing against the front edge only; the back of No. 3 is filed with the same strokes of the file as used for the front of No. 2; and No. 4 is brought to a point by filing the front edge only. The teeth are thus brought to the same size and shape.

## Circular Saws

In fitting a circular saw the first thing to do is to true it up if it is out of round. This is done by holding a piece of emery or grindstone or a flat file fastened to a board, squarely across the points as the saw is rotated by hand. Rotate the saw backward. This operation is carried on until the saw is not only round but also the points of the teeth are all the same distance from the centre, so that each tooth will do its work.

The saw may be set by using a standard circular set or a hammer-and-anvil set. For the latter a piece of railroad iron may be used. From the square end of the iron, file a bevel which runs

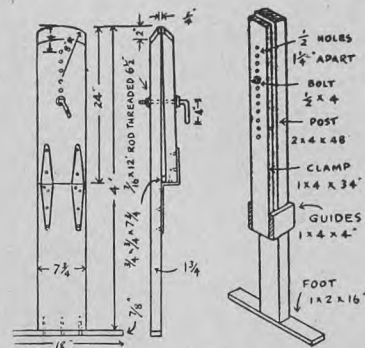


Fig. 5. Two types of circular saw clamps.

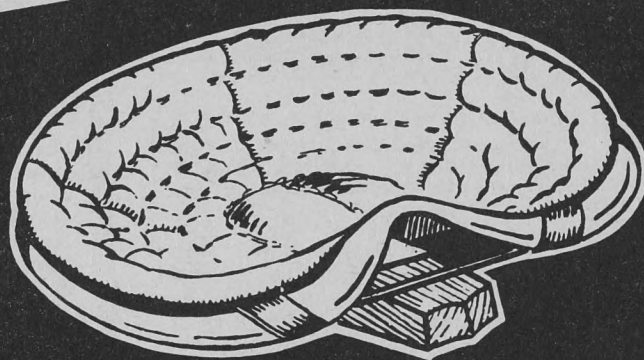
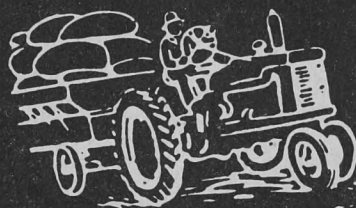
back one-quarter of an inch, and is 1-32nd of an inch deep at the end. The setting is done by two men, one holding the saw and the other using a heavy





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## SECTION 7

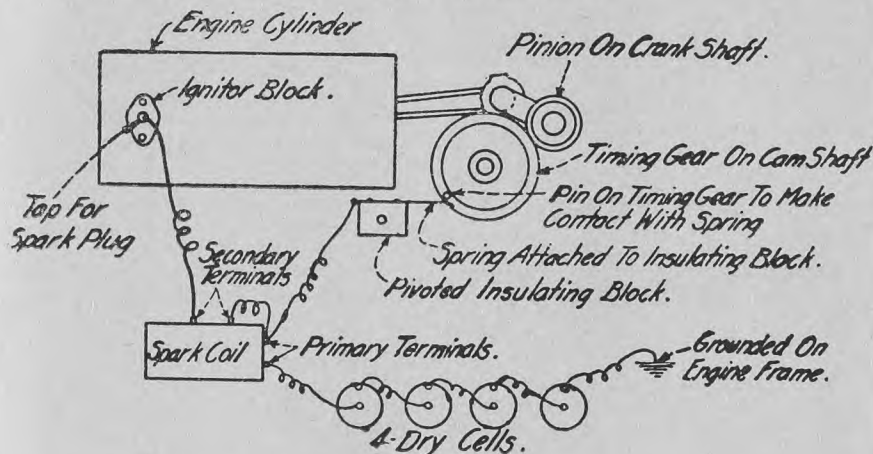
# Electricity and Electric Wiring

## How To Correct Faulty Timing

Faulty timing or ignition is the great cause for gas engines being discarded. This is especially true of the older type of low tension ignition which does not use a spark plug. The high tension or spark plug ignition is so much better and more reliable that now few if any low tension engines are built. In general it will not pay to replace worn parts of low tension ignition, whether battery or magneto, but they should be changed over to battery spark plug ignition, using the method shown clearly in the diagram. Take the igniter block to a machine shop and have the larger hole drilled and tapped for a standard size spark plug, while the smaller hole is plugged by tapping or welding in a short stud or bolt. The timing device is simply a drop welded on or a short pin tapped

into the half-time or cam gear in such a location that it will touch the insulated spring just before the piston reaches compression dead centre. The coil used is a model T Ford or other vibrating jump spark coil. Four dry cells or a hot shot battery furnishes the current, or a small auto storage battery can be used if preferred.

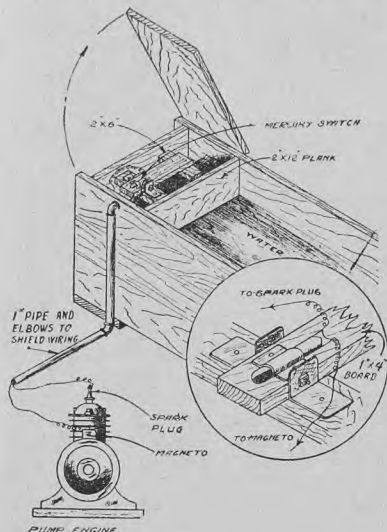
If the engine has spark plug ignition furnished from an oscillating or rocking magneto and the magneto gives trouble better discard the magneto and arrange the battery ignition as shown, as it gives much less trouble from getting out of time. Over ten years ago I bought for five dollars a three h.p. engine on which the magneto had gone bad, and installed the timing pin and spring with model T coil, and it is still giving satisfactory service.—I.W.D.



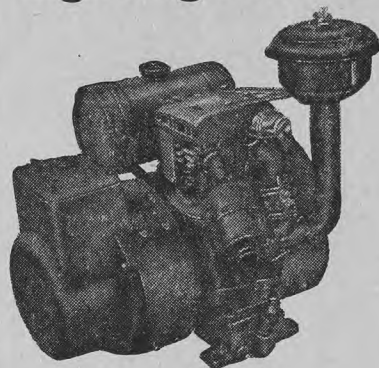
## Mercury Cut-off Switch for Pump Engine

A simple wood float, fitted with a

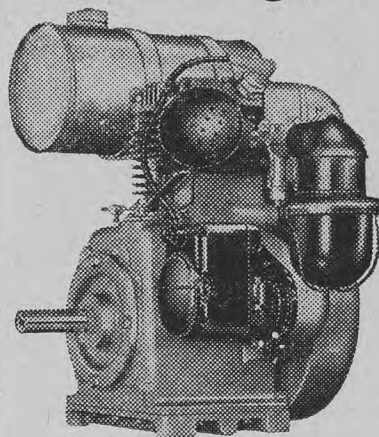
mercury switch, is ideal for stopping a pump engine and preventing overflow of water and waste of gasoline. The mercury switch is used in many electric controls, such as temperature regulator control switches used for automatic coal stokers. They can be obtained from any well stocked electrical store and are inexpensive. The sketch shows the mercury switch attached to the hinged arm of a wood float, in a manner similar to that of a spirit level. When the water is below the full level of the tank, the float arm is tilted downward and the mercury in the tube flows towards two lead-in wires in one end of the tube and thus contacts both of them. One of the lead wires from the mercury tube is connected to a high tension cable from the magneto. The other lead wire is connected to a high tension cable attached to the engine spark plug. When the tank is full, the float arm becomes tilted upwards so that the mercury in the switch flows away from the two contact wires. The flow of electric current from the magneto to the spark plug is thus interrupted and the pump engine stops.



## Lighting Plants



## Air-Cooled Gasoline Engines



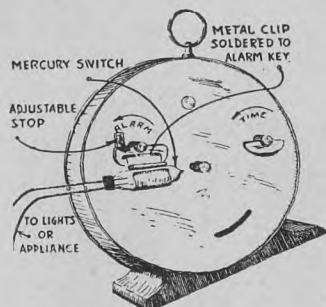
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## Alarm Clock Time Switch

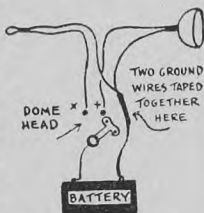
An alarm clock can be used for making a simple time switch for turning lights on or off, or for automatically switching electric current on or off for



other mechanical purposes. A mercury switch, such as is used with various electric controls is fastened to a metal clip, which in turn is soldered on to the alarm winding key. The clip is made out of a piece of tin, copper or brass and is bent to fit the mercury switch. The two lead wires from the mercury switch are connected to the electric light circuit in the same way as an ordinary toggle switch. An adjustable stop is fastened on the back of the clock to limit the travel of the alarm key sufficiently to allow the mercury in the glass tube to flow to or from the enclosed contact points. In operation the clock is wound up as usual. The alarm is also set in the conventional way. When it is desired to have lights turned on, or a motor started at a set time, the mercury switch is set as shown in the sketch. When the lights or electric power are to be turned off, the mercury switch is taken out of the clip and reversed and then placed back in the clip.

## Switch for Van

Here is a very easy switch to make for a van with a double contact bulb. I used the T top of a Ford coil. It snaps on two round headed screws. The coil top swivels on a little wooden plug from a twine ball. It is notched so that when you turn the switch on it does not slip.

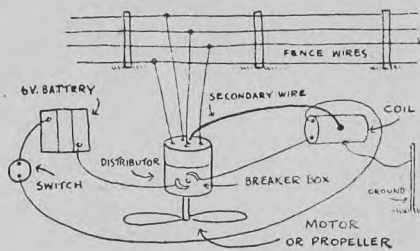


## Electrifying Farm Fence

"I wish to electrify a fence surrounding my feed yard. A six-volt battery will supply the current. What type of coil should I use and how should the whole outfit be wired?"—R.L.B., Swanson, Sask.

To electrify a fence using a six-volt storage battery you require a six-volt ignition coil such as is used in most modern cars. In addition an interrupter is desirable as this will conserve the battery and under the worst conditions

of shock will produce less serious results. The complete distributor of a wrecked car mounted in a stand with a small wind propeller is a simple interrupter. A motor driven interrupter made from



a six-volt fan motor could also be used and driven from the battery. This latter plan, though harder on the battery would be the most satisfactory as it would work in calm weather. The wiring of this outfit is identical with the wiring of the car from which the parts were taken except that the wires which lead to the spark plugs are now connected to the various fence wires and the ground of the coil system is connected to a rod driven into the ground. The diagram would be typical for most car wiring systems.—Prof. G. L. Shanks.

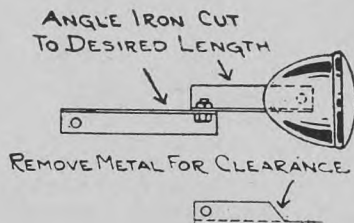
## Electric Persuader



This home-made electric livestock prodder is used for touching up stubborn cows, hogs, or other animals when they object to going up loading shutles or into trucks or cars. It consists of a Model T Ford coil clamped to an old billiard cue and actuated by a three-cell flash-light battery and a simple push button switch. Insulated wires leading from the coil out to the end, deliver a hot spark where it will do the most good. This is much more humane than a club or a pitchfork and does not bruise the flesh or damage the hide.—I.W.D.

## Mounting Rear Tractor Light

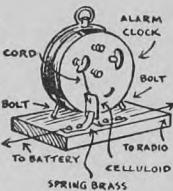
Here is a handy mount for the rear light on the tractor. It is made of two pieces of light 1/2-inch by 1/2-inch angle iron each about three or four inches long. The two irons are held together



by a bolt as shown, and are fastened to the fender or tractor frame by a second bolt. The light may be adjusted for height by loosening the first bolt, and from left to right by loosening the second bolt.—I.W.D.

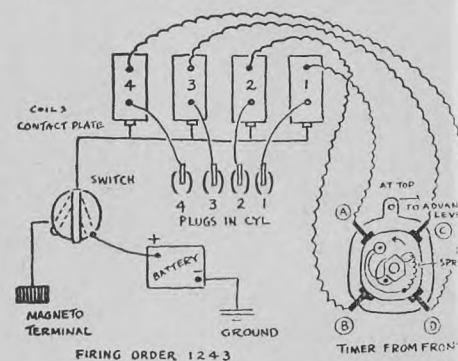
## Alarm Clock Starts Radio

If you would sooner be awakened in the morning by your favorite morning program than by the raucous call of an alarm clock you can hitch the clock to the radio. The clock is mounted in place as illustrated, the bell removed and the alarm set as usual. When the alarm goes off the winding of the string around the winder lifts a piece of celluloid allowing the metal points to form contact. Obviously the regular switch must be left turned on so the clock can do its stuff.



## Wiring Model T Engine

A subscriber states that he wishes to make a circular saw engine out of a Model T engine, using all four cylinders and also using clamp to the battery. He states: "What I wish to find out is how to wire the coil timer and the spark plugs." Prof. G. L. Shanks answers: "What your enquirer wants is a complete wiring diagram for an old Model T Ford. The attached diagram indicates



all the necessary connections and names the parts."

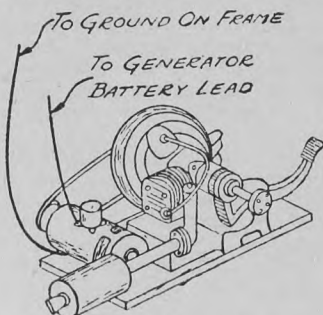
Another subscriber writes: "By using the Model T spark coils is it possible to build up the voltage of the 6-watt battery or generator? I have a 6-volt outfit but find in many cases it hasn't the power needed. Could you tell me how high I could jack the voltage, if any, and also the watt power?"

To this question Prof. Shanks replies: "Your subscriber is apparently on the track of a perpetual motion idea. It is true that a Ford spark coil will step up voltage from 6 volts to approximately 5,000 volts, but it is done at the expense of the amperage. In the end the volts times the amperes or watts, is less than in the beginning and there is a loss in watts rather than a gain."



## Handy Battery Charger

A handy portable arrangement for quickly recharging auto or radio batteries or for furnishing light at camp consists of a small washing machine engine mounted on a two-inch plank with a V-belt driving an auto generator clamped to the same board with the bolt holes slotted for belt adjustment.

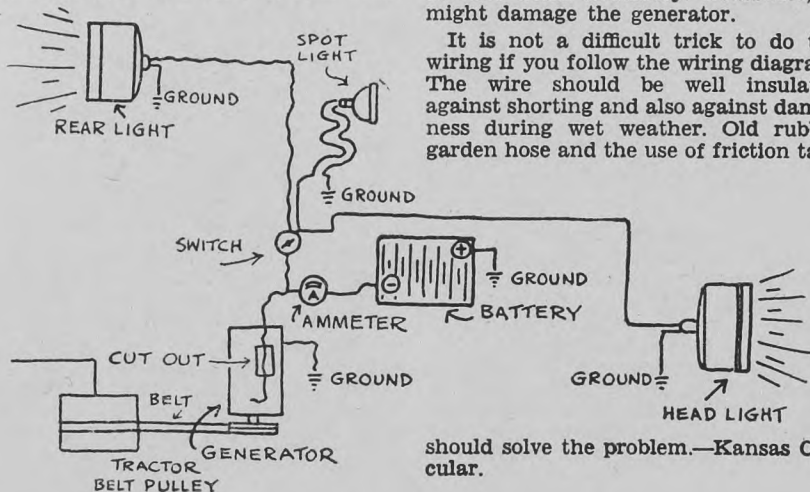


The heavy wires from the generator are fitted with heavy battery clamps, one being fastened to the car generator terminal or to the ammeter terminal and the other grounded on the engine or frame. Such an outfit will deliver from 10 to 15 amperes and will recharge a battery in a few hours.—I.W.D.

## Lighting System for Tractor

All parts with perhaps the exception of the V-belt can be taken off an old car. The principal trick is to take the generator and attach it to the tractor in such a way that it can be driven by the tractor belt pulley. Most tractors have a 10-inch belt pulley which runs at about 900 r.p.m. The proper speed for a generator is about 2,200. Therefore, one must see to it that the correct size of pulley is used on the generator to develop the proper speed. In this particular case the generator pulley should be about four inches. Your tractor dealer can give the rated belt pulley r.p.m. for your tractor if you do not have a speed indicator.

Even the old dead battery can be used, and it is not necessary to buy a new one. However, if the battery is dead



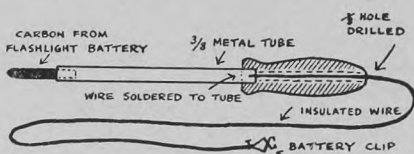
there will be no lights while the motor is not running. But a battery of some sort must be used to take up the excess current when necessary. Otherwise, it might damage the generator.

It is not a difficult trick to do the wiring if you follow the wiring diagram. The wire should be well insulated against shorting and also against dampness during wet weather. Old rubber garden hose and the use of friction tape

should solve the problem.—Kansas Circular.

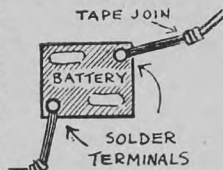
## Six-Volt Soldering Iron

I have a diagram here showing how to make a six-volt soldering iron. The wire from the battery clips on one post of the battery and a wire from the work to be soldered to the other post thus making a circuit. I have found this iron to work very successfully.—John Nickolson, Cairns, Alta.

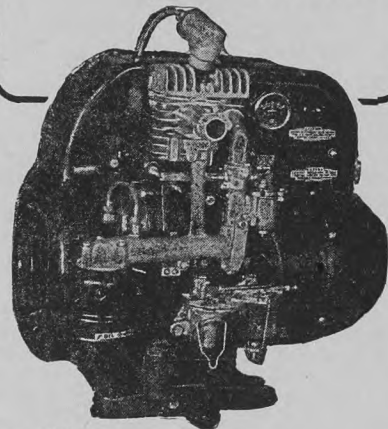


## Avoiding Bad Connections

You can avoid bad connections at battery terminals by soldering the terminal clamps to the posts and joining the leads a foot or so away. The joins in the leads will have to be wrapped with tape to protect them and prevent short-circuiting.—Grant Macleod.



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ELECTRIC  
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FAIRBANKS-MORSE  
COMPANY LIMITED**

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If the local F-M dealer cannot supply you, mark the items in which you are interested and mail to the nearest F-M branch. We will advise you if and where the equipment may be obtained.

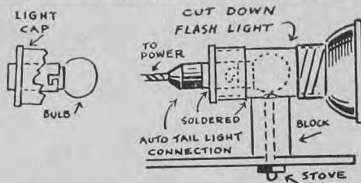
Water Systems.....	<input type="checkbox"/>	Windmills.....	<input type="checkbox"/>
Lighting Plants.....	<input type="checkbox"/>	Wind Charger.....	<input type="checkbox"/>
"Z" Engines.....	<input type="checkbox"/>	Electric Fence.....	<input type="checkbox"/>
Hammer Mills.....	<input type="checkbox"/>	Hand Pumps.....	<input type="checkbox"/>
Grain Grinders.....	<input type="checkbox"/>	Wash Machines.....	<input type="checkbox"/>
Scales.....	<input type="checkbox"/>	F.W.	<input type="checkbox"/>

Name.....

Address.....

## Rear Light for Tractor

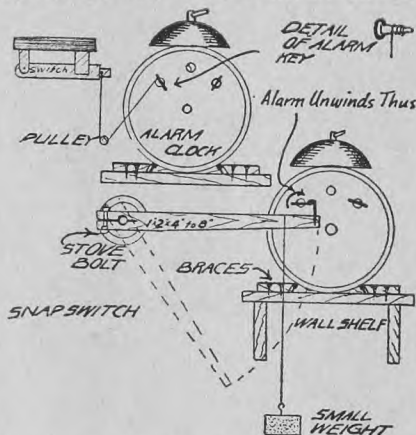
A rear light for the farm tractor can easily be made by cutting a flashlight down as shown. A hole is made through the flashlight cap where an auto tail light connection and bulb is soldered on.



The light is mounted to the rear of the tractor by means of a wood block and stove bolt, which is first pushed through from the inside of the light case. Such a light gives considerable illumination at a minimum cost and with very little power.—A. S. Wurz, Jr., Rockyford, Alta.

## Alarm Clock Time Switch

An alarm clock can be used as a time switch for any electric circuit on the



farm or in the shop. It will turn off the poultry house lights, the battery charger, the milk cooler, turn on a small stove and other similar jobs.

Where electricity is not used, the clock and wooden control arm can be set up to control the furnace dampers. For this arrangement connect the front damper of the furnace to the rear damper on the stove pipe by a light chain over a set of rollers. Adjust the chain so the front damper is three-quarters open when the rear damper is just closed. Balance the system with a small weight so the front damper stays open. In the evening connect a strand to the alarm clock control to hold the weight on the chain up (front damper of furnace closed, rear open). The alarm clock (remove the bell) will drop the weight and reverse the dampers at six a.m. in the morning.—W. Kalbfleisch.

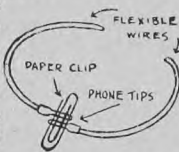
## Getting Most Out Of Batteries

Where a multiple dry battery is used for starting or for ignition in an internal combustion engine during cold weather, the battery should be brought into the house at night so that it may be at room temperature when put into use in the morning. Flashlight batteries, in cold weather, will give much

better service if kept at ordinary room temperature when not in use. Cold does not permanently injure a dry battery, but it does interfere with its functioning.

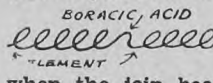
## Jiffy Connector

I found that a paper clip serves excellently when temporary test connections are to be made. While the diagram shows two phone tips held together with a paper clip, almost any connection could be made in a similar manner. Flexible wires, as well as solid ones can be joined together without the trouble of twisting them.—Wm. J. Dutka, Emerson,



## Repairing Electric Element

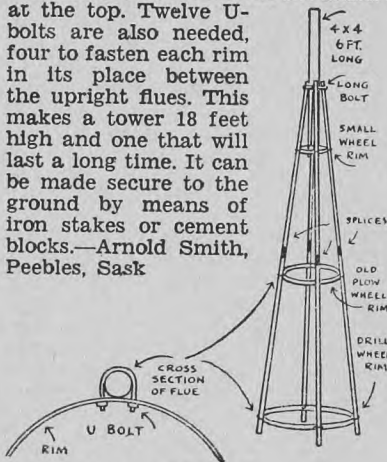
Join the wires together loosely, using as little wire as possible. Switch off the



current when the join becomes white hot, and put on a little boracic acid. Then shake the join until it arcs and you have a weld.—Grant Macleod.

## Tower for Wind Charger

To make a tower for a battery charger, take boiler flues from an old steam engine and get them acetylene welded, making four pipes each about 16 feet long. A piece of 4x4 about 6 feet long and three old wheel rims are needed, one from a drill wheel, one from a plow wheel and a third about 12 inches in diameter. Four long bolts are needed, two about 10 inches long for the top of the flues and two about 14 inches long to make the 4x4 secure in the small rim at the top. Twelve U-bolts are also needed, four to fasten each rim in its place between the upright flues. This makes a tower 18 feet high and one that will last a long time. It can be made secure to the ground by means of iron stakes or cement blocks.—Arnold Smith, Peebles, Sask



## Timing the Engine

One of the common causes of poor engine performance and decreased engine efficiency is incorrect timing of the ignition. I have personally known of many cases where the efficiency of the engine has been increased as much as 40 per cent by correct timing. This is true of small engines, automobiles and tractors. Ignition usually occurs at dead centre for starting and in advance to

fire before dead centre for running. Timing will usually be correct on new engines and it is only when the unit has been removed, repaired or replaced or where wear has taken place that the ignition timing will be incorrect.

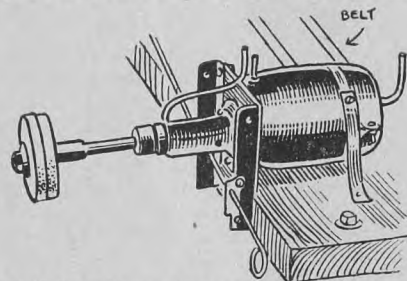
On practically every engine ignition marks will be found to aid the operator in checking timing. The marks are found in a variety of places and if the operator is not acquainted with the procedure it would be best to read that part of the instruction book that deals with timing. On some machines the timing can be advanced or retarded while the engine is operating on a steady load.

In order that the operator may get the extra miles to the gallon it is necessary to have the breaker point gap and the spark plug gaps correctly spaced as well as seeing that all wiring is in good condition.—O. H. Lovelace, Saskatoon, Sask.

## Generator Makes Grinder

This simple grinding wheel mounting is an old car generator with an extended, threaded shaft, strap iron brace strips and the belt running on the commutator. Copper tubes, bent to shape and soldered in place, carry oil to the bearings.

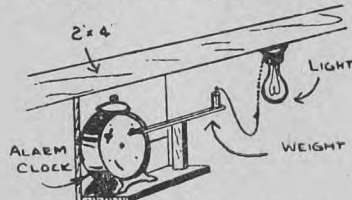
For a price usually less than a dollar, you can get a burned out generator with



good bearings which, after months of service, will be tighter and smoother running than the bearings in a grinding wheel stand with plain bearings, but built especially for the purpose and costing a great deal more.—Dale Van Horn.

## Alarm Clock Time Switch

The diagram shows a very effective but easily constructed time saver for any poultryman using electric lights.



Secure an alarm clock and fasten it down to a board or timber to which the light and pull switch are attached. Make the distance from clock to switch at least four inches. Place a piece of lath or light board on a nail or stick as a fulcrum, place one end of the lath not more than half way under the alarm wind and on the other end a weight

Continued on page 77





# Peter Pepper

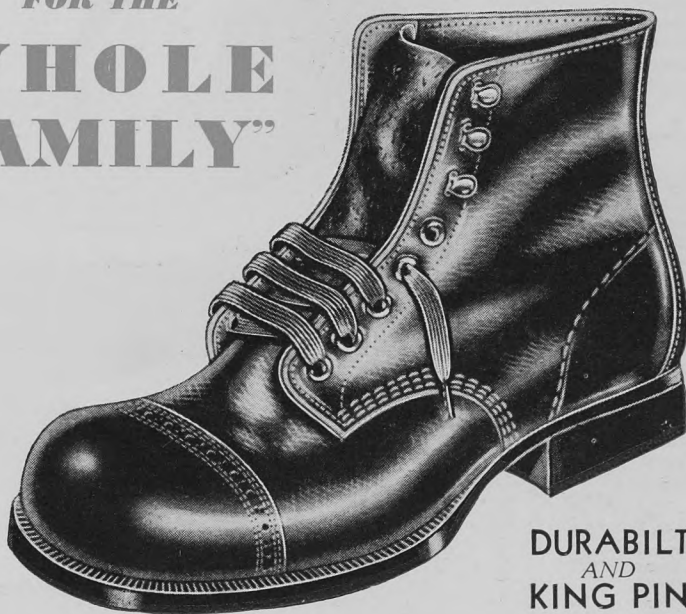
says:

## “BUY BRANDED SHOES!”

FOR THE  
**WHOLE  
FAMILY”**



—and,  
He wears  
**MINER  
RUBBERS**  
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AND  
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**DURABILT and KING PIN**  
**WORK BOOTS for MEN and BOYS**

**CRITTENDEN** } *Men's Fine Shoes*  
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FOR THE SMART YOUNG MISS

**PETER PAN**

FOR HAPPY CHILDREN



**ASK FOR**

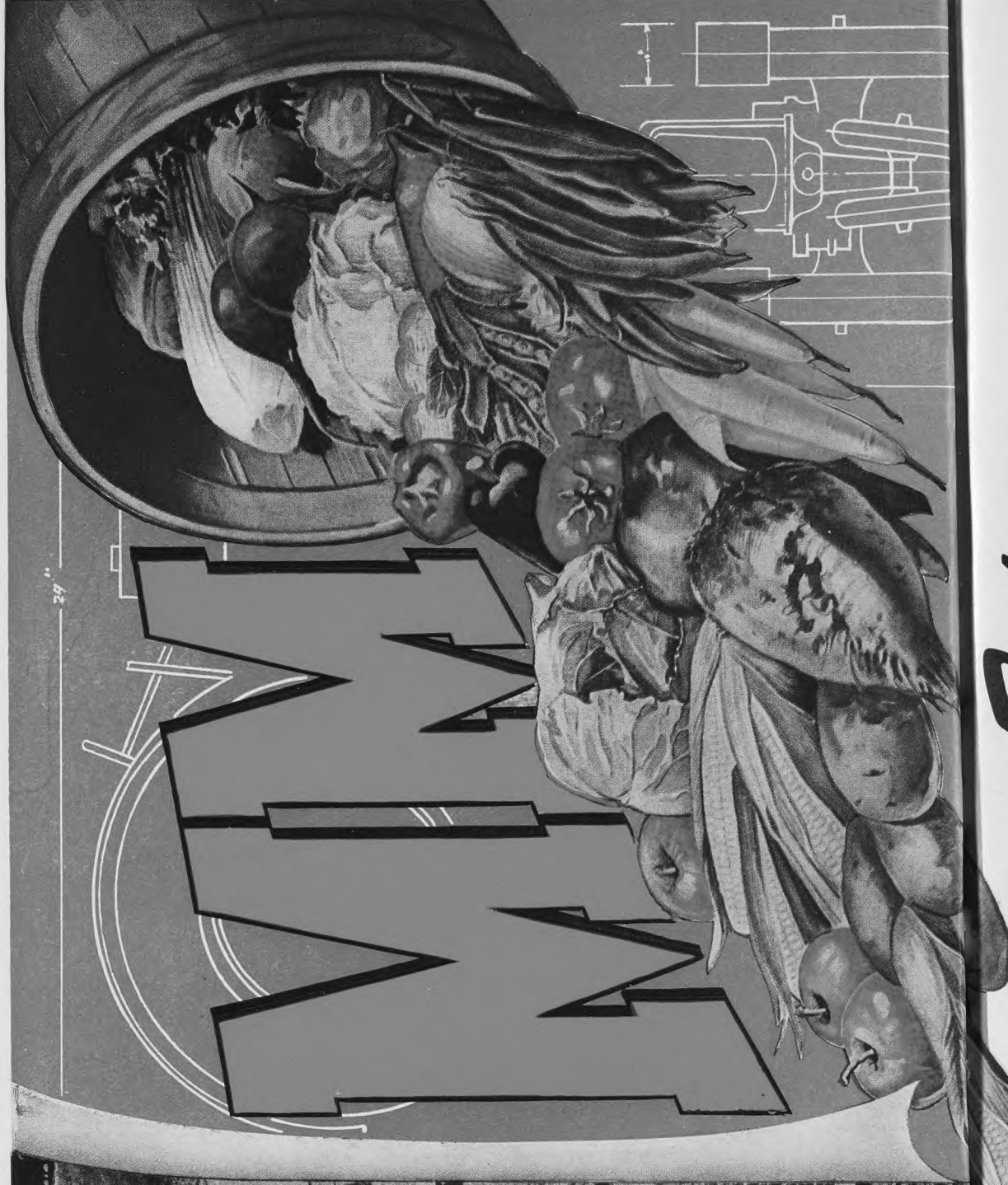
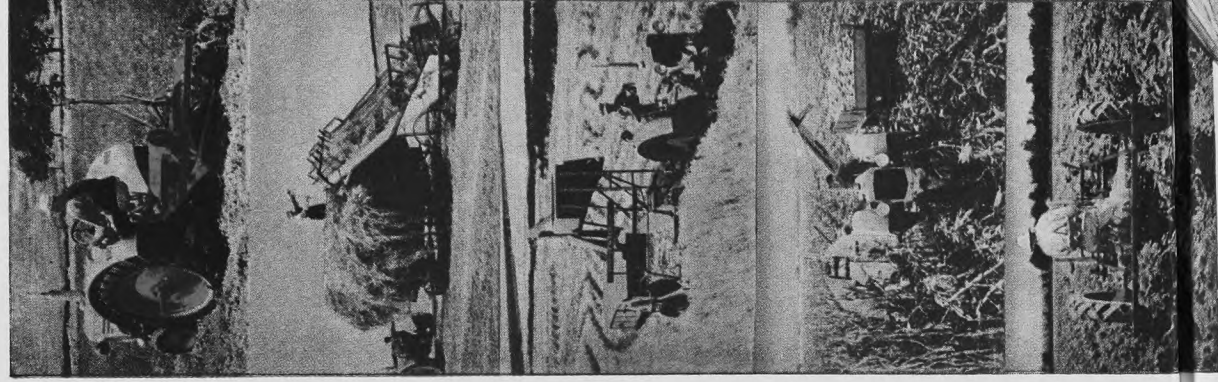
**These *BRANDED* Lines**

**At Your HOME-TOWN Store**

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# Today's Farm Equipment Calls for Today's Farm Workshop . . .

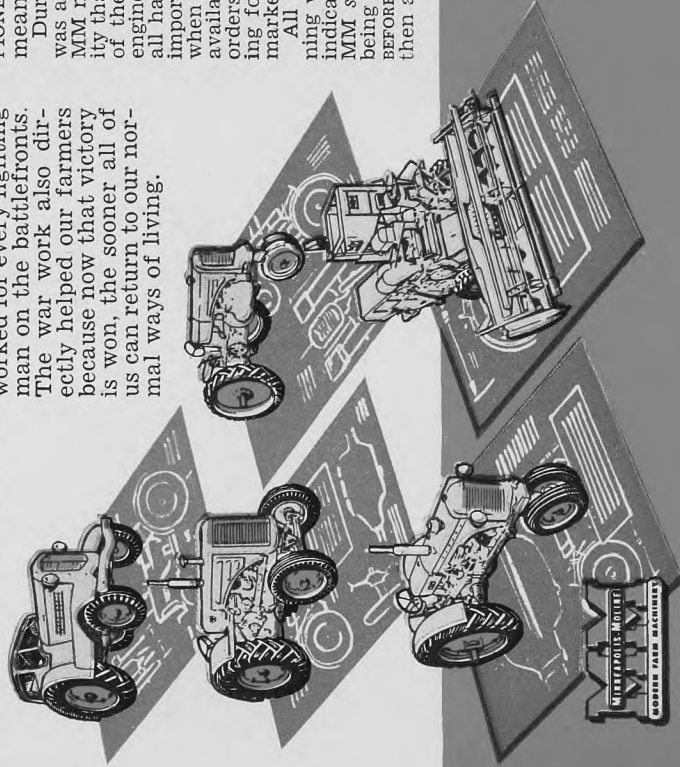
● An up-to-date Farm Workshop is as essential TODAY as a modern Barn. Good care and timely repairs are "MUSTS" in this new era of mechanized farming . . . CARE SAVES WEAR . . . TIMELY REPAIRS SAVE UNTIMELY REPLACEMENTS . . . Keep your FOOD PRODUCING equipment in good working order.





# BLUEPRINTS OF THE Future

ENGINEERING BLUEPRINTS of the past, and the records of the Products made from these Blueprints *often* indicate to farmers what they can rightfully expect from the blueprints of the future of any company. During the war, Minneapolis-Moline had an outstanding record in producing many precision weapons and parts for the armed services. By doing these things for the war effort, MM contributed to the welfare of our country and worked for every fighting man on the battlefronts. The war work also directly helped our farmers because now that victory is won, the sooner all of us can return to our normal ways of living.



Even during the war years, Minneapolis-Moline has been producing all the farm machinery and tractors allowed by government limitation orders for which materials could be obtained on time. Look at the record of Minneapolis-Moline! Many outstanding contributions in the tractor and farm machinery fields have been pioneered by MM in co-operation with farmers. Today, the Minneapolis-Moline policy of ENGINEERING and PIONEERING for *simplicity, dependability and economy* means more than ever to farmers.

During the war years, when not enough farm machinery was available to replace machines being worn out, owners of MM modern machinery and tractors had a better opportunity than ever before to *learn* for themselves of the high quality of the materials put into MM equipment—to *learn* of MM engineering that many find is always years ahead . . . and all have learned that "know-how" in manufacturing is also important in producing top quality products. At this time, when fewer MM products are being made than are normally available, farmers who need new machinery are placing their orders with MM dealers early. Many who can wait, are waiting for the MM Modern Machinery that will be put on the market as soon as is practicable.

All during the war years, MM engineers were busy planning what the new MM products of the future will be. One indication of what is yet to come is shown at the left—the new MM *self-propelled* Harvester of which a limited quantity is being made. The MM tractors shown on this page, INTRODUCED BEFORE THE WAR, INDICATE, we believe, that MM was years ahead then as NOW.

Many MM Tractors and Machines of the past indicate MM will lead the parade of progress in pioneering new things for the farm in the future. American farmers' eagerness to seek new methods and machines to save time, labor and expense and their ability to buy modern farm machinery and tractors has raised their standard of living to the highest of any agricultural people anywhere in all the world. Keep your machinery in good operating condition

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## NORTH AMERICA HAS WITNESSED A FARM EQUIPMENT REVOLUTION!

- The era of leaving valuable machines outside to ROT and RUST is as out-of-date as obsolete equipment.
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# The Victory of Peace

remains to be won . . .

great contribution of food for victory now assumes a new responsibility to humanity: that of contributing toward the building up of the standard of food consumption and of nutrition, by means of which alone—in the opinion of many foremost thinkers—can the perpetuity of peace and security be assured.

More than any other single commodity, FOOD will play a foremost part in the rehabilitation of the world and its peoples and in the stabilization of world economy and the restoration of world trade.

“Peace hath her Victories” and in the promotion and maintenance of peace the contribution of the western farmer as food producer will, in the immediate years ahead, be one of primary importance in bringing about a new era in the history of the human race—an era of lasting Peace.

*To all farmers of western Canada this pioneer co-operatively owned and operated farmers' Company extends its sincere good wishes for future service in the cause of Victorious Peace. . . . U.G.G. also pledges its utmost co-operation in serving the best interest of all farmers in feeding the world of free peoples.*

**I**N this, the memorable first year following Victory over the terror which for a time threatened to engulf the world and render impossible the peaceful co-operation of free peoples, United Grain Growers Limited records with the pride of a co-partner, the contribution of our farmers in Food Production and its Distribution to the United Nations during the six years of the war . . .

Included among the published records of the Canadian farmers' war services are the production and distribution of nearly 10 billion bushels of wheat and other cereal foods. Over  $3\frac{3}{4}$  billion pounds of bacon. Two and three-quarter million dozen eggs. Ten and three-quarter billion pounds of milk and milk products, and the production of 68 million meat animals excluding hogs.

The western farmer having thus attained the stature and importance of a world citizen by his

## United Grain Growers Ltd.

Co-operatively Owned and Operated since 1906



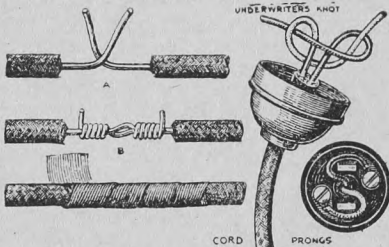
sufficiently heavy to operate the pull switch when the weight drops. When the alarm unwinds, the weight falls and jerks on the light. If desired, a light spring may be used to fasten weight to pull chain.—I.W.D.

### Care of Battery

I would suggest owners of two-volt radios using a six-volt storage car battery for operation by cabling to a single cell at a time; to change over to a new cell at least every three days and repeat this process until the three cells are all discharged at the same rate and about at the same time. Using a single cell until it is completely discharged is a bad practice, as after the third or last cell is discharged the first cell reaches a deplorable condition; excessive hard sulphate forms on the plates which offers a high internal resistance. Unless a low charging rate is used, the cell will heat, possibly causing the plates to buckle and throw out the paste from the grids. Thus each cell would have to be charged separately, or the charging current maintained low or the battery may be ruined; but by having all the cells at a more or less equal discharge; recharging then will be faster and the life of the battery prolonged.

### Electric Wiring Tips

In wiring your home for electricity or in making any changes in the wiring



It is important that you do a good job of splicing the wires. Poor connections may arc and cause a fire. See drawings A, B and C for splicing details. In making a splice, remove the insulation for a length of about three inches from the end of each wire and scrape the wire bright with a knife or piece of sandpaper. Then bend the ends at right angles to the wires, hook them together and twist each tightly around the other wire with pliers so that a firm contact is made. To prevent corrosion and to obtain a good electrical contact the joint should be soldered. It should then be wrapped securely with rubber tape applied while the joint is still hot from soldering so the rubber will be vulcanized. Friction tape should cover the rubber and extend at least one-half inch beyond the points where insulation was removed and should be compressed firmly.

The other figure shows how to tie a knot that will relieve strain on individual wires attached to an electric socket or also how wires should be placed around the bayonet prongs of a plug to give a connection maximum strength.

## Says Mr. Gold Seal,



Congoleum's a subject  
That I love to talk about,  
No matter what the time of day  
Its praise I gladly shout!

And, best of all, Congoleum  
Makes good my proudest boast;  
This favourite floor covering  
Is tops from coast to coast!

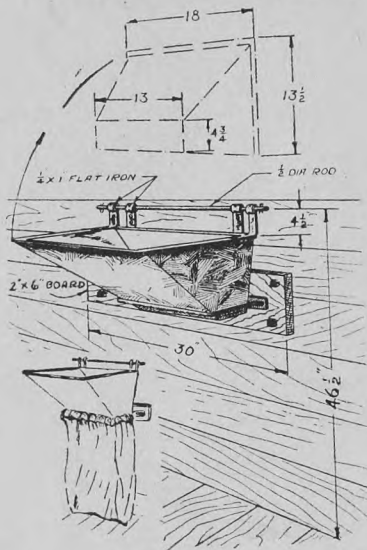
So low in cost; so high in worth;  
Its colours please the eye:  
'Twill startle you so little cash  
Such quality can buy!

It comes in countless patterns gay;  
Just choose one for each room:  
To clean it, just mop lightly  
Or sweep gently with a broom!

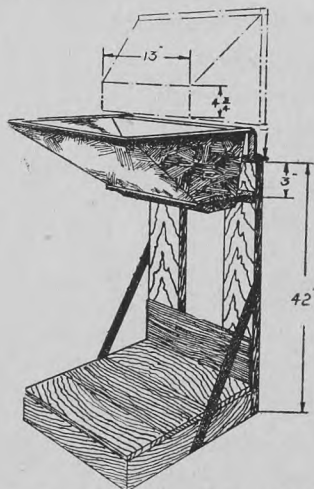
# Constructing Simple Gadgets

## Sack Chute and Holder

This sack filler and holder can be made to be fastened on a wall or on a portable stand. When attached to a stand, the sack holder can be placed on



a platform scale so that seed or feed grain or other seed can be weighed. The chute or hopper is made of sheet metal and reinforced with 1x1/4-inch flat iron at the top edge. The hopper is hinged on a piece of 1/2-inch rod as shown in the sketch. The hopper is first lifted and the sack is then hung on the 3/4-inch round iron sack holder. The front and side edges of the sack opening are folded over the sack holder and the rear edge is caught on a sharp pin (not shown) in the frame at the back. The hopper is then allowed to drop down

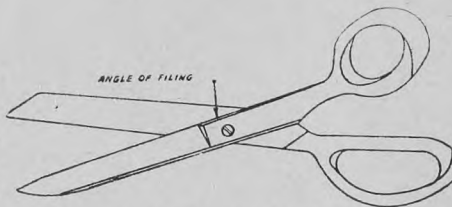
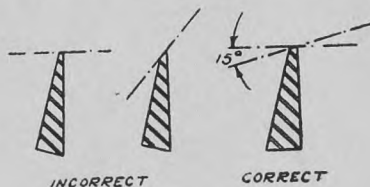


and holds the sack firmly while at the same time it provides ample room for filling the sack with a scoop or a pail without spilling the grain. The height

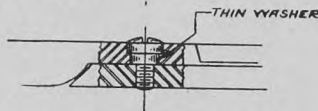
for the hopper is made to suit standard size grain sacks and measurements shown in the sketch should be followed accordingly. If sacks are short, pieces of plank on the floor or on the stand can be used to take the weight of sacks as they are being filled.

## Sharpening Shears

Sharpening shears or scissors is not a difficult job. A good, sharp, fine-toothed flat file and ordinary good care are the chief requirements. Secure the shears firmly in a vise in a horizontal position. Light, firm, even strokes in the cutting direction are required. Lift the file at the end of each cutting stroke. Do not draw the file backwards on the



shear edge before applying the next stroke. Drawing the file backwards will dull both the file and the shear. The cutting edge of the shear blade must be filed at the correct angle, which is about 15 degrees. This is often indicated by a bevel near the screw as shown in the sketch. Do not file away any more metal than is necessary. If the shear blades are loose due to wear of screw seat, place a very thin washer below the head



of the screw, sufficient to take up the slack. Do not attempt to remedy loose scissor blades by undue tightening of the screw, unless the screw is simply loose.

## Wire Snipper

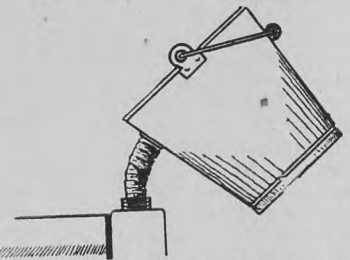
I found this a very handy tool for snipping wire. A pair of scissors that can no longer be used in the house can be converted into a good pair of wire cutters. Cut off the scissors the desired



length and then grind out a semi-circle in one blade, sharpen with a small whet stone and lubricating oil. The blades can be hardened by heating cherry red and plunging into old cylinder oil.—C. Leder, Neerlandia, Alta.

## Water or Gasoline Pail

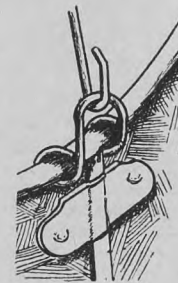
A serviceable water or gasoline pail can be made by cutting a hole in the side near the top of a pail. A piece of flexible metal hose or a 3-inch length of 1-inch galvanized pipe is soldered on



at the hole. If the pail is intended to be used only for filling radiators with water, the metal hose or pipe can be omitted and the water allowed to flow through a hole near the top of the pail. This hole should be from 1 inch to 1 1/2 inches in diameter, depending on the size of the radiator opening.

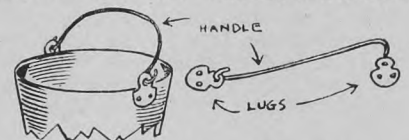
## Repair for Pail Handle

When a handle lug on a pail handle breaks drill two 1/4-inch holes just below the rim of pail about 1 1/4 inches apart. Bend a piece of 1/4-inch round iron into a "U" shape so that the space between the two arms of the "U" is one inch. Then turn the two ends to partly form two eyes, about 1 inch in diameter to complete the repair link. Place the repair link on the handle of the pail and then slip the ends of the open eyes through the two 1/4-inch holes in the pail. Now the two eyes can be closed with a hammer to complete repair.



## Door Hook From Old Pail Handle

Old pails should not be thrown away. The sheet metal may come in useful for many purposes. The metal bale and lugs can be used for making a door hook.



The bale is left attached to one lug and cut the right length and bent into a hook. The other lug then is placed where needed. Each lug has to be bent at a right angle.—Paul Tremblay, St. Paul, Alta.



# "Serving Agriculture with Chemistry"



OUT OF A TEST TUBE come these Agricultural Chemicals—INSECTICIDES, FUNGICIDES, FEED SUPPLEMENTS, FERTILIZERS, and WEED KILLERS—to increase profits through greater farm production.

## • INSECTICIDES (Pest Control)

**Atox (Derris Dust)**—For wide variety of insect pests, including flea beetle and beet webworm.

**Deenate**—D.D.T. insecticide for barn spray and control of insects on live-stock.

**Licide**—For lice control on cattle, horses, pigs and sheep.

**Warbicide**—For control of the warble fly on cattle.

**Nicotine Sulphate**—For poultry lice and aphids on plants and shrubs.

**Lead Arsenate, Calcium Arsenate, Paris Green.**

## • FUNGICIDES (Seed Treatment)

**Ceresan**—For wheat, oats and barley.

**Semesan Bel**—For potatoes.

**Semesan Jr.**—For corn.

**Semesan**—For vegetable and flower seed.

## • FEED SUPPLEMENTS

**Sol-Min**—Mineral for cattle, horses and sheep.

**Pig-Min**—Mineral for hogs, sows and young pigs.

## • FERTILIZERS

**C-I-L 2-20-0**—For grain crops.

**C-I-L 4-8-10, 4-12-6, and 4-12-8**—For truck garden crops.

## • WEED KILLERS

**Ammate**—Non-poisonous, ideal for poison ivy control.

**2, 4-D Selective Weed Killer**—removes dandelions and plantain without harm to lawns.

**CANADIAN INDUSTRIES LIMITED**

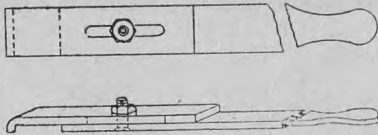
FERTILIZER DIVISION

WINNIPEG — CALGARY — NEW WESTMINSTER



## Barrel Plug Wrench

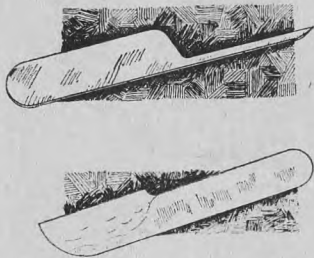
An old plow lever can be used to make a wrench to fit oil barrel plugs. Such a



wrench can be made adjustable as shown in the sketch. When it is not necessary to make the wrench adjustable, the slot and plow bolt can be omitted and the two parts can be either welded or rivetted together to make a wrench of permanent size to fit the standard size barrel plug.

## Knives From Old Files

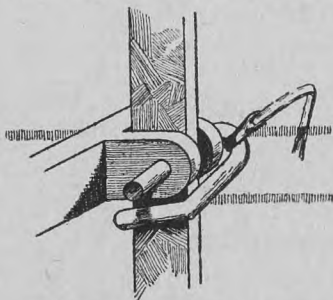
Old flat files are useful for making various kinds of knives, such as hoof knives, poultry killing knives, scrapers and wood chisels. The old file should be first annealed by heating to cherry red



and allowed to cool in wood or coal ashes. The old teeth then can be ground off on an emery stone. Any shape of blade can then be forged on an anvil. After retempering, the blade is then ground smooth and sharp similar to the hoof knife or poultry killing knife shown in the sketch.—H.J.K.

## Pump Jack Pin

Frequently a pump jack pin gets mislaid or lost and causes some delay in getting the pump hooked up for operation. A pin bent to shape as shown in the sketch is easily inserted or taken out. The bent end keeps the pin from falling out when the pump is being operated. A piece of lace leather or a light chain on the pin and fastened to the pump or pump jack will insure this handy pin from being missing when it



is needed. The diameter of the pin should fit the holes in the pump rod and

jack as closely as possible to prevent undue vibration and wear to the entire pump and jack assembly.

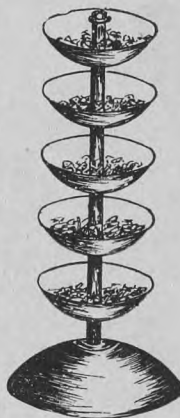
## Battery Cap Lifter

We find this easily made gadget very handy in lifting the corroded caps from a car battery. Material one-eighth inch thick or thinner can be bent cold but as this is rather thin, use a nut on the inside of the gadget for the bolt to go through. Slip the points under the clips and turn the bolt and off they come.—Sidney Ransom, Sr., Mountain-side, Man.



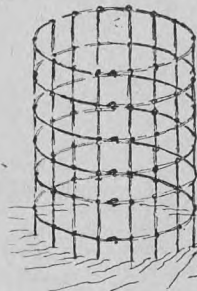
## Parts Rack From Disc Harrow

An old disc harrow gang can be used as a rack for bolts, nuts, washers and screws. A discarded disc from a one-way disc machine can be used to make a good wide base. If only old discs are available, then pieces of 1½ or 2-inch pipe can be used as spacers. Both ends of each piece of pipe are plugged with wood. Holes are drilled through the wood plugs to fit a ⅝ or ¾-inch round iron rod. The rod is threaded at both ends and fitted with nuts and washers. This rod is used to hold the discs and pipe spaces lightly together instead of the original square shaft or arbor.



## Supports For Peonies

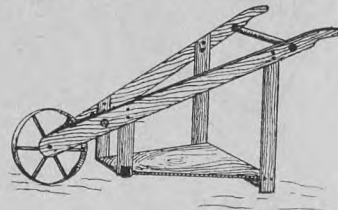
Peonies and other plants with large heavy blooms frequently need good support to keep the flowers off the ground and appear their best. Wire fencing makes ideal supports when formed as shown in the sketch. Supports for peonies should be 30 inches high and 18 inches in diameter. Place the supports over the peony plants early in the spring. Keep the foliage



inside of the fence until the flower buds are well formed. Allow the flower buds to protrude through the openings in the fence so that they get ample sunshine. When the plant is fully developed the fence will not be seen and the entire plant with all its blooms will be shown to advantage and be protected from strong winds. Try these supports in various sizes for other plants. Delphiniums eight feet high can be supported by such means.—H.J.K.

## Handy Single Wheel Cart

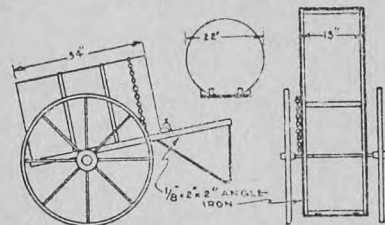
One 18-inch farm implement wheel, two light handles and a minimum of framework provides a handy cart around the farm for transporting such things as sacks of feed, plants in flat boxes for the garden, milk and cream cans, drinking water, wood for the stove, etc. Any handy farm boy would find pleasure in making this simple cart and make his farm chores lighter for additional reward. The handles, as well



as the framework can be made of 1x4-inch lumber. Hardwood is preferable. The platform can be made of ordinary boards. A piece of strap iron 2x1½ inches is bent 2 inches at each end and used to support the front end of the platform, while a 1x3-inch wood cross piece will support the rear of the platform.

## Oil Barrel Cart

This oil barrel cart was designed by the North Dakota extension service en-



gineering department. The barrels are loaded in the same manner as a load is picked up with a warehouse truck. Tilt the barrel over and push the nose of the cart under. Then fasten the length of chain around the barrel and pull down on the handle. The frame is made 13 inches wide which will take a 22-inch barrel. The details are available by studying the sketch.

## Protect The Fingers



When cutting paper or clipping magazines with an old safety razor blade only the corner of the blade is used to do the cutting so why have

the whole edge exposed with danger to the fingers? Just fold a piece of adhesive tape right over the blade. The corner will cut through it the first time it is used but the rest of the edge will remain covered.

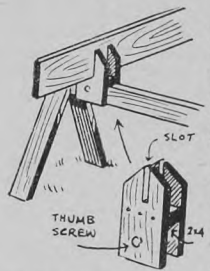
## To Remove Road Tar Spots

Linseed oil or kerosene oil will remove road tar without damaging the finish of your automobile. Saturate the spots



of tar with the oil. Let the oil stand for a few minutes to allow it to penetrate the tar. Heavier spots require more time. Then remove each spot with cheesecloth. The oil softens the tar so that it can be easily rubbed off. Then wash with water in the usual way.

### Saw Horse Accessory



gadget in place but for most work it is unnecessary.—D.C.R.

### Hot Water Bottle Holder



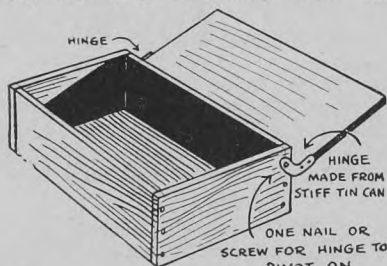
in the bed. It will work equally well for a well person who uses the bottle as a bed warmer.—M. Lambert.

### Home-made Belt Dressing

To make a hammer mill belt pull good in winter, roll up a piece of an old inner tube and tie it with a piece of wire long enough to make a handle, pour on a few drops of gasoline, and light with a match. This is held over the running belt for a few minutes, and the melting rubber gives the belt a long lasting tacky surface which prevents snow from bothering.—I.W.D.

### Hinge for Small Box

I found these hinges very suitable for a small box and very easy to make. They are very serviceable and work

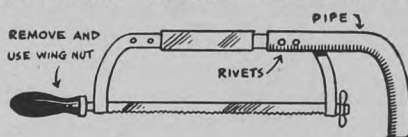


just as well as other elbow hinges. For a very small light box tin from any tin can is plenty strong enough. For a larger box, sturdier sheet metal is needed.

### Hold Handle Hacksaw

The handle is made of a pipe, which is bent to the desired shape. Two small holes are bored in the saw frame and

in the pipe, the holes to coincide with each other. The pipe where it fits on



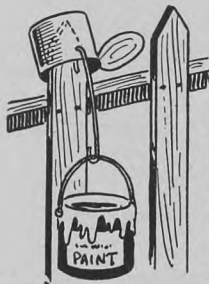
the frame has to be sawn lengthwise, so as to fit on each side of the hacksaw frame. The handle and the pipe are riveted together. The wooden handle is taken off and a wing nut replaces it to keep the blade at the correct tension.—Thos. Wishart, Starbuck, Man.

### Sawing Granary Door Boards



I noticed the post-master's assistant in our town sawing the door boards for a granary he was building at a slight angle. On enquiry it was explained and demonstrated that, cut like this, they lift out without difficulty. It isn't necessary to slip or pound them to the top to remove them.—H. D. Falconer, Glentworth, Sask.

### When Painting the Garden Fence

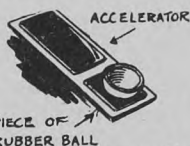


catch it on the handiest picket with the paint can hung in the hook.—D.C.R.

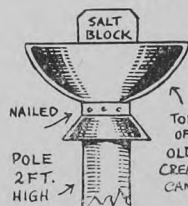
When doing it, the trouble is to find a holder for the paint can. Here is an easy way to overcome the difficulty. Just take an empty can, punch a hole in the side of it, make a wire hook and fasten to it. Then when painting just

### Another Use for a Rubber Ball

A woman driver with high heeled shoes should get the man of the house to cut a hollow rubber ball in two and attach one half of it to the accelerator upside down. The high heel fits nicely into the socket thus made. Soft rubber will not damage the heel in any way.—D.C.R.



### Stand for Salt Block



the whole being about 2½ feet high.

I saw this stand in a field I was passing. Take an old cream can and cut the top part off. The post is just big enough to fit into the neck of the can. The top is then nailed to the post,

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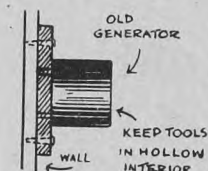
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The handles are removed so that the animals will not hook behind them. The top does not fit the post so tightly as to prevent the drainage of rain water.—Edwin Unger, Mayfair, Sask.

### Tube Repair Rack

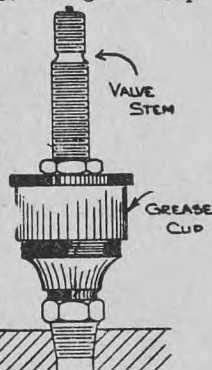


Take an old generator and discard all except the heavy casing. Mount on a block of wood measuring 12 x 12 x 1½ inches. The complete rack is then screwed fast to the

side of the garage where it is ready for constant use. In making repairs to inner tubes, the tube is hung over the rack and held down with the foot, and the repair patch applied.—Dorland A. Hotz, St. Boswells, Sask.

### Pressure Grease Cup

This is a diagram of a handy home made pressure grease cup. It consists of a common grease cup, through the cap of which is drilled a hole large enough for a discarded auto tire valve stem to go through, with a valve stem nut on each side of the cap. The valve stem takes the grease gun nicely, but the valve core must be used to hold in the pressure. In case a 45 degree bend is needed, the valve core can be removed, the stem heated and bent to the shape wanted, the valve core inserted, and the stem then locked in the grease cup cap with the two nuts. This would be of especial value in overhauling old discs and other machines equipped with large grease cups.



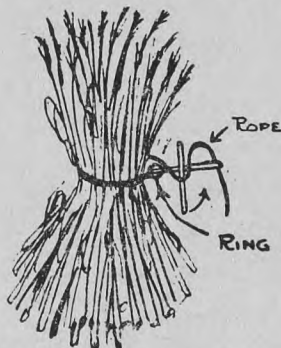
In the other diagram we showed how one reader made a pressure lubricator by soldering an auto tire valve stem into the cover of an ordinary grease cup. This works fine in summer, but is likely to give trouble when the grease gets stiff. This trouble can be avoided by screwing or soldering a regular Alemite or Zerk fitting into the cap so a pressure gun can be used for forcing the grease in under pressure.—I.W.D.



### Fodder Shock Binder

This diagram shows one way of tying fodder shocks so they will not tumble down, even when the corn is very tall. Use a small rope with a ring or a loop in one end. Stick a large wooden pin

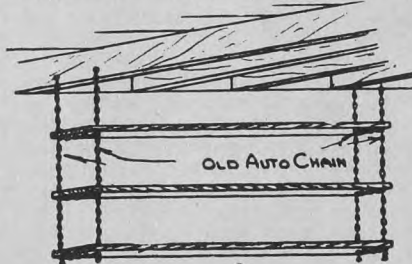
into the shock about where you wish the tie to come. Lay the ring or loop on this large pin, extend rope around shock and pass over large pin. Put a smaller



pin under rope and through the ring or loop at right of large pin. Bring end of rope under large pin and loop over end of small pin. With the small pin begin to wind the rope around the large pin, keeping the end of the rope to the outside. Wind tight enough to bring the shock into shape, then tie with binder twine, and remove rope. This makes the pressure even all around and does not pull the shock out of shape.—I.W.D.

### Hanging Shelves

This diagram shows how to use old auto skid chains to make good supports for hanging shelves in a basement. The chains are suspended from bolts in the floor joists, and the shelves are placed



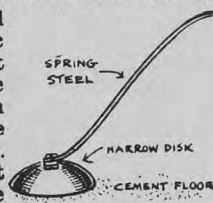
on the cross chains. Be sure that all of the links are in good condition, so that if the shelves are loaded heavily they will not break.

### Generator Fails at Higher Speed

When the car generator charges normally at lower speeds but falls off to zero at 35 miles or more, the trouble is very likely due to badly worn brushes, weak brush springs, rough commutator, or perhaps a combination of these troubles. Better have these conditions checked, as neglect may require a new generator.

### Disc Scrapes Cement Floor

Take an old blade from a disc harrow and mount on a suitable handle. Inch iron piping would make a good handle. Bend it so that when standing the



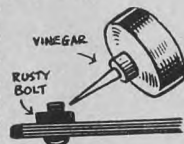
disc fits closely on the floor. This does not take the place of a flat scraper but is good for lifting stuff that has become stuck to the floor.—D.C.R.

### Starting Cold Tractor

One method of starting a very cold engine or tractor is to pour one cup of high test gasoline and one-fourth cup of alcohol into a bottle. A few drops of this mixture, poured into the priming cups or into the carburetor air intake usually wakes up a seemingly dead engine. Most auto supply stores have similar cold weather starting materials on sale at moderate prices.—I.W.D.

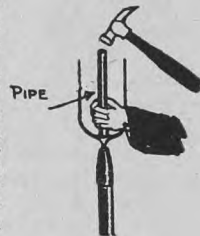
### Loosening Rusty Nut

This substitute for penetrating oil will come in handy when loosening rusty nuts. Put some strong vinegar in a clean can and squirt on the bolt and around the nut. In a few minutes the nut can be readily removed.—A. S. Wurz, Rockyford, Alta.



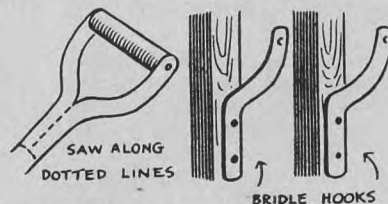
### Repairing Pitchfork

To put a new handle on a three-tine pitchfork, slip a piece of pipe over the centre tine, then with a hammer drive the fork into the handle. This avoids the danger of bending or breaking the fork and insures its being driven in straight.—I.W.D.



### Bridle Hooks

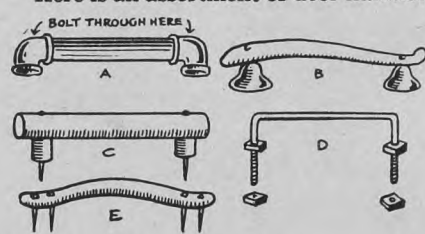
Do not throw broken shovel handles away. They can be turned into some-



thing useful. A shovel handle of the type shown here makes two good hooks for bridles or straps in the horse stable. Saw along the dotted line and nail to the wall.—Paul Tremblay, St. Paul, Alta.

### Assorted Door Handles

Here is an assortment of door handles.





A is made from a bit of inch pipe and two elbows. Bolt through where shown. B is especially suited for a barn door and gives a novel effect. It is made from a harness hame and two old bells. It is fastened to the door with a couple of bolts. C is made up from an old fork handle. It can be fastened on with nails, clinched on the inside of the door. D is made from a piece of round iron stock threaded at both ends and bolted through the door. Go to the bush for the material for E. It is a natural bend or curve simply nailed to the door and the nails clinched on the other side of it.—Paul Tremblay, St. Paul, Alta.

### Rope Assembly for Cream Can

Take a short piece of rope about three feet long and splice it into another rope seven feet long about  $2\frac{1}{2}$  feet from the end. The ends may be tied to the handle of the cream can or better still hooks provided to grab the handles. The other end of the long rope is fastened to the top of the ice well.—Fraser Robin, Ingils, Man.



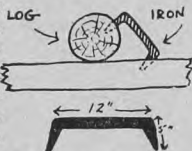
### Felt Hat Fuel Stainer

An old felt hat placed inside of your truck or tractor funnel will prevent no end of fuel system and carburetor troubles. Just be sure that it is clean and has no holes or perforations in the crown. Rub a film of new cylinder oil inside of it at the start. You will find it superior to several dollars worth of cham-ois as it holds back all the dirt and water and lets the fuel through twice as fast.—Robt. J. Roder, Reist, Alta.



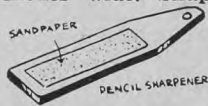
### Supports Log While Hewing

It is difficult while hewing small logs to make them stay put, but not when you use this simple device. Two short bits of old iron are sharpened at the ends and then bent as shown. Then attach them to the log and the skids, both on the side way from the hewer. The log will stay put all right.—Ralph Boesem, Fisherton, Man.



### Boys' Pencil Sharpener

First take a piece of wood about  $\frac{3}{8}$  of an inch thick, 5 inches long and  $1\frac{1}{2}$  inches wide. Shape the handle and round off the corners. Then cut out a piece of sandpaper and glue it on the holder. By holding the holder in one hand and rubbing the pencil on the sandpaper with



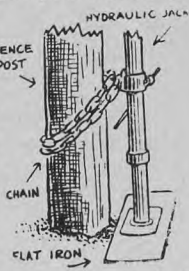
the other you can make a nice pointed lead. — Ernest Lavrolette, Box 208, Kamloops, Alta.

### Preserve Manure Spreader

Here's another use for used transmission oil drained from your car. Coat the chains on your manure spreader with it. They will work much more smoothly and lengthen the life of the chains.

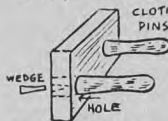
### New Use for Hydraulic Jack

The hydraulic bumper jack makes one of the easiest and quickest post-pullers to be found on the farm. Here we see a stubborn corner post set three feet deep being pulled with ease. All that is needed is the jack, a halter chain with snaps, and a piece of flat iron long and wide enough to prevent the base of the jack sinking into the ground. Try it the next time instead of starting up the tractor and lugging around a heavy chain and post-puller.—J. L. Strang, Flowing Well Farm, Claresholm, Alta.



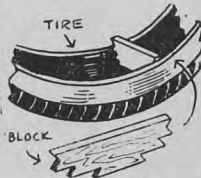
### Improved Clothes Hooks

I was unable to buy the wire kind so I used old fashioned clothes pins. I took a piece of 1x4 and bored the holes the right size. Then the pins were driven in the proper distance and cut off flush with the back of the board. Wedges held the pins in position without glue or screws. The pins will not come through knitted goods as a wire hook will do.—A. S. Wurz, Rockyford, Alta.



### Tire Spreader

This simple device or something like it is widely used and saves considerable trouble when making minor repairs to a tire. Simply take a bit of inch stuff and cut the notches in it to give spreads of three, five and seven inches.—J. B. Glenn, Winnipeg.



### Folding Door

In a kitchen which is small and the door to the basement entrance opens against the wall where the oil stove was placed, the door was sawed in half and the two parts hinged as



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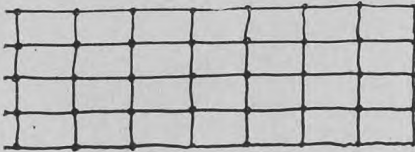
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shown. They could then be folded together so as to occupy much less space than the single door. Three heavy butt hinges were used for this purpose, as the door will stay in shape much longer than with only two.—I.W.D.

### Holds Tops on Stacks

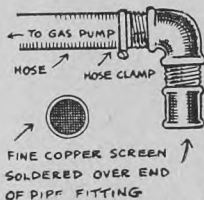
I have found this plan to save a lot of trouble and hay. It keeps the fall gales from blowing the tops off stacks. I save the old twine from my green feed



bundles for the job. Just tie them together again and make the net. It should be four feet longer than the stack, so that two feet of it hangs down over each end. A rail is hung on each side. It does not make channels down the side of a stack as a pole does if left for some time.—Horace H. Clarke, Evansburgh, Alta.

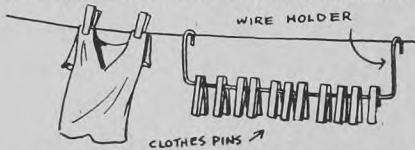
### Gasoline Screen

This is a system for screening gas which I made on the end of a gas pump hose. It works very well and is easily cleaned by turning off the end fitting and blowing dirt out of the screen. If  $\frac{3}{4}$ -inch pipe fittings are used, then it will be easy to drain gas out of the hose into the barrel since the fitting can be put into the small bung hole of the barrel.—Cecil W. Tuininga, Neerlandia, Alta.



### To Hold the Clothes Pins

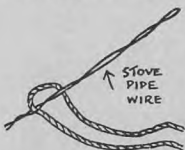
A clothes pin holder can be made from a piece of wire bent in the form of a long U. It will be found especially



useful in cold weather when gloves or mitts have to be worn when putting the clothes on the line. It is easily slid along the line as the clothes are pinned on.—Paul Tremblay, St. Paul, Alta.

### For Sewing Jute Bags

I like this simple little device for sewing jute bags better than a million needles. Take a piece of stove pipe wire and bend and twist it, using a nail to make the eye. Use the end which has the bend as the point of the needle. It can also be



used to sew on pant buttons. Use an awl to make the hole in the bagging.—John McKay, Rembro, Ont.

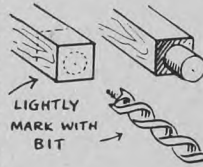
### A Handy Sanding Block



This arrangement avoids the use of the fingers and thumb to hold the sandpaper to the block. A piece of 2x4 is used and slots made in the end to take two thin wedges. The corners of the block are rounded. Thin felt glued on, to go under the sand paper will improve the working quality.

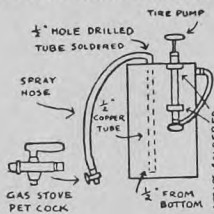
### Fitting Ladder Rungs

When making a ladder, a baby crib or a basket type rack the work will be much more easily done and greatly improved if the rails or rungs are fitted in the way shown here. The size of the end of the rung is marked with the same sized bit that is used for boring the holes to take the end of the rung.—Paul Tremblay, St. Paul, Alta.



### Homemade Spray Pump

A simple pressure type sprayer for applying chemicals to plants or trees can be made at little cost from a small oil drum, a tire pump and a few fittings. Near the top of the drum mount a valve stem from an old inner tube. Clamp the tire pump to the side of the drum, attaching the hose to the valve stem. A  $\frac{1}{2}$ -inch copper tube which extends to within about half an inch of the bottom of the drum is next soldered in position and a coupling attached, to which a 10-foot length of garden hose can be coupled. At the outer end of the hose attach a gas stove pet cock.



### A Trap That's Always Set

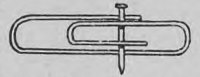
Use a pail or the bottom half of a square oil can. Grease the round can well and roll it in crumbs, wheat or seeds until it is well coated. In the bottom put a few inches of water.

The mice jump from the board to the can, which turns around and dumps them into the water.—Mrs. Velma Sanders, Balfour, B.C.



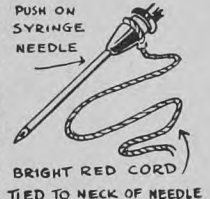
### To Start Small Brads

This is an easier way to start brads than holding them in the fingers. Use a paper clip, of the size to hold the brads used. It is easier to hold the clip than the brads in the fingers.—Paul Tremblay, St. Paul, Alta.



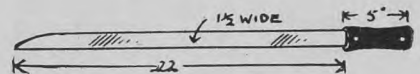
### Saving Syringe Needles

Tie about 18 inches of bright red cord to the neck of your vaccine syringe needle. Then if it is knocked out of the operator's hand it will be quite easily found, even though it falls among litter or is trampled underfoot.—Robert J. Roder, Relist, Alta.



### Hedge Trimmer

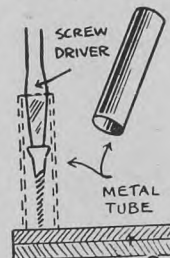
This knife I cut from an old cross-cut saw. After removing the temper by heating in a wood fire built on the ground, the saw was left to cool in the ashes over night. Next morning I marked it off, leaving a little for finish-



ing the rough edges. I then put it in a vise, cut out the blade with a cold chisel, straightened and sharpened it, drilled two holes for a hardwood handle and then retempered it, taking care not to get the steel too hard, otherwise it would become too brittle. To trim the sides, the hedger keeps the hedge on his right hand side as he walks slowly along, striking downward, keeping his eye slightly in advance of his work so that no time is lost in deciding what must be trimmed and what not.—R. H. Brooks, Half Moon Bay, B.C.

### Starting a Screw Nail

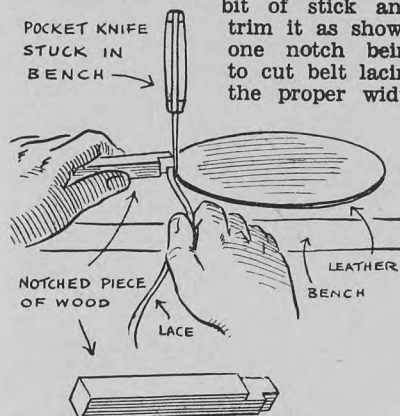
A short piece of metal tubing will help to start screw nails if it is placed around the screw and the driving end of the screwdriver. It will prevent the screwdriver from slipping off the slot in the head of the screw nail and will hold the screw plumb. The tubing is held with the fingers of one hand while the other manipulates the screwdriver. A piece of tubing of the proper size can be made from an empty rifle shell if sawed at the proper places with a hack saw.—Paul Tremblay, St. Paul, Alta.





### Lace Leather Cutter

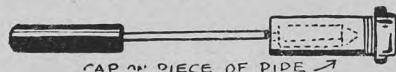
To start with, all you need to make this gadget is a jack knife. Hunt up a bit of stick and trim it as shown, one notch being to cut belt lacing the proper width



and the other to cut shoe lacing. Then stick the jack knife in the bench and go to work on the leather, which has been trimmed approximately round. You will soon get on to the knack of making laces as fast as you can count them.

### To Heat Soldering Iron

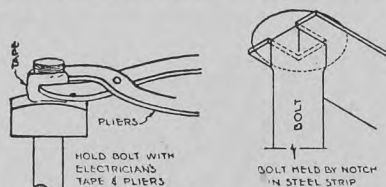
To heat a soldering iron in a coal or wood stove, cap a piece of pipe, place it in the stove and insert the soldering



iron in it. This will overcome burning the tinning off the iron.—Grant McLeod.

### Loosening Tight Nuts

When carriage bolts become rusted it is difficult to remove the nuts. Here are two simple suggestions to solve the difficulty in a hurry. A few drops of pene-



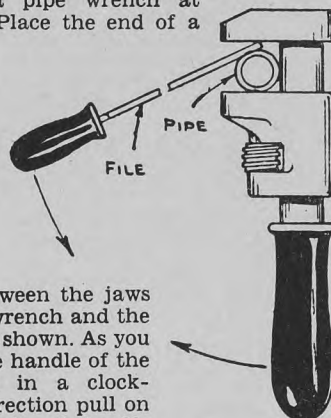
trating oil or kerosene applied and let stand a few minutes will make the job easier.

### Use of Monkey Wrench

When starting a nut with a monkey wrench never hold the wrench with the jaws pointing away from you. Always have them facing you. It is not a good practice to use a monkey wrench on a six-sided nut. It causes an unnecessary strain on the wrench and soon rounds off the corners of the nut. Neither does it do a monkey wrench any good to use it as a hammer. Better use a real hammer.

### File Pipe Wrench

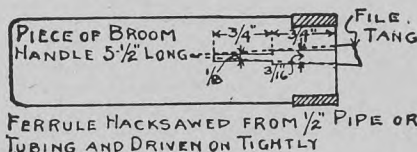
This shows how a monkey wrench and a file will hold a pipe when you do not have a pipe wrench at hand. Place the end of a



file between the jaws of the wrench and the pipe as shown. As you pull the handle of the wrench in a clockwise direction pull on the handle of the file in the opposite direction as indicated. This will tighten the grip of both these tools on the pipe.—I.W.D.

### Handy File Handles

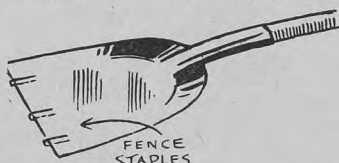
Most farm shops are sadly lacking in decent file handles. This shows one which can be made in 10 minutes and which will fit any file and last a lifetime. Cut off a piece of broom handle about 5½ inches long, hacksaw a ferrule from a half-inch pipe or light tubing, trim one end of the handle down, and drive the ferrule on tightly. Next bore a 3-16-inch hole about ¾-inch deep, a ⅛-inch hole about ¼-inch further, and then round off the other



end so it will be comfortable to the hand. Serviceable handles can even be made from a piece of corn cob if one end is trimmed down and a ferrule screwed on, made from the bottom shell of an electric socket or the outer shell of a garden hose coupling.—I. W. Dickerson.

### Protecting Scoop Shovel

To protect the grain shovel from catching on nails on a rough floor when shovelling grain or coal, make three runners to keep the edge slightly



above the surface. These are ordinary fence staples. Simply put them on the edge and hammer them flat.—A. S. Wurz, jr., Rockyford, Alta.



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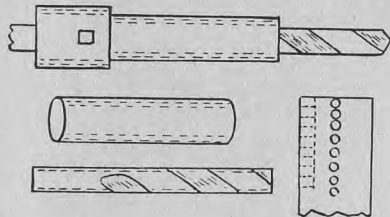
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## Two Ideas in One

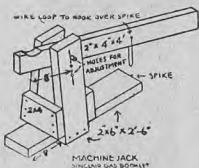
This sketch illustrates the idea of putting a tube on a drill to gauge the depth of the hole and also a flattened drill to level the bottom of holes bored for making a key seat. To make the key seat, first centre punch the holes carefully, being sure they are in line with the shaft and right distances apart. Then drill the holes to the right



depth. It is best to drill every second hole first, then the ones in between. Then flatten the bottom, and with a sharp cold chisel, the sides of the key seat can be easily finished. I generally use a drill 1-16 inch larger than the width of the key which makes it still easier to finish. — James E. Moscrip, Major, Sask.

## Machine Jack

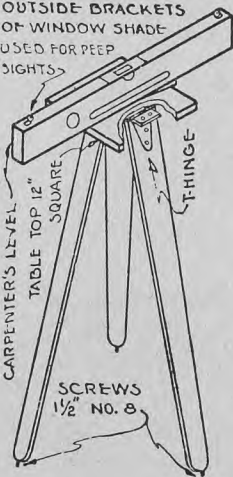
A few pieces of good lumber make a sturdy and serviceable handy machine jack for use when repairing and greasing. Three holes are put in for adjustment of height. From the pin to the end of the lever is eight inches. The base is



a piece of 2x6 cut 2 feet 6 inches long. A wire loop, attached as shown on the handle, slips over a spike on the base to hold the machine up.

## Handy Farm Level

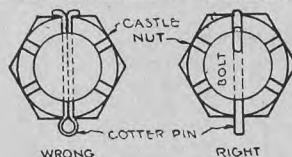
To make this assembly just take a piece of board or better still of plank, 12 inches square and plane the top side until it is smooth and true. Three legs, about 4½ feet long are made from inch stuff, preferably fir. These are attached to the under side of the table with T-hinges as shown. The hinges must have tight knuckles to prevent play. Put a screw nail in the bottom of each leg and file off the flange. This will help get a



firmer footing in some locations. The stand is set up with the table as level as it can be conveniently made. An ordinary carpenter's level is used, with outside brackets of a window shade to serve as peep sights. It is almost impossible to get a level sighting along the top of a square and these sights are necessary for accurate work. A thin wedge is used to make the level level.

## Proper Use of Cotter Pin

This sketch shows the right and wrong ways to fasten a cotter pin in place. Do not, as shown at the left, have the eye of the pin crosswise of the stud. Place

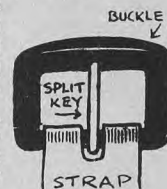


it lengthwise so that the head of the pin goes right into the slot of the castle nut, close to the stud. One half of the lap is brought up over the top of the stud and the other half is bent downward, in the opposite direction.

## Buckle Tongue From Split Key

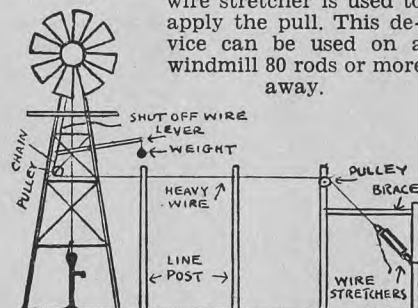
An old buckle can sometimes be repaired by removing the old or broken tongue and putting in its place a split key or cotter pin. Sharp edges can be removed by filing. I have found this to be a very satisfactory repair. —

Donald H. Clark, Neepawa, Man.



## Turning Off Distant Windmill

This diagram explains itself. The chain from the windmill comes down around a pulley well up in the tower and is attached to a heavy wire. This wire is carried by line posts to the buildings. A wire stretcher is used to apply the pull. This device can be used on a windmill 80 rods or more away.



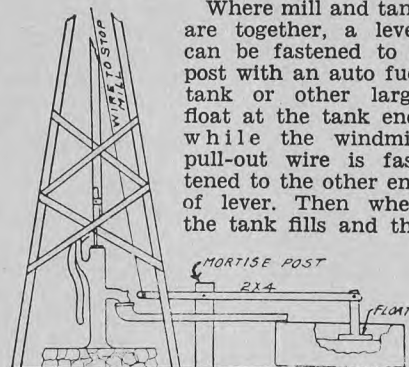
## Repairing Chain

To repair a broken chain, use a nail bent as shown. This comes in handy these days when repair links and even haywire are hard to get. You can always find a nail around the place. — Henry Schuett, Westmark, Woking, Alta.



## Pull-Outs for Windmill

Where mill and tank are together, a lever can be fastened to a post with an auto fuel tank or other large float at the tank end, while the windmill pull-out wire is fastened to the other end of lever. Then when the tank fills and the

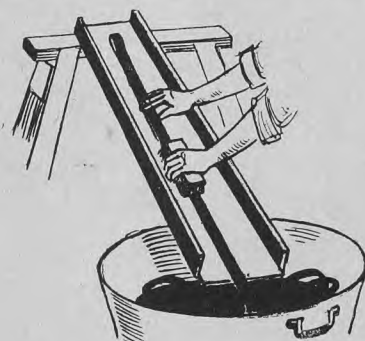


float rises, the other end will pull down on the pull-out wire and throw the mill out of the wind.

Where the tank is several rods from the mill, an ordinary tank float valve can be put on the supply pipe at the tank. A branch pipe from the tank pipe is taken off near the pump, brought up a foot or so, and then led down into a five-gallon milk can hung below the well platform by being attached to the windmill pull-out wire. When the rising water in the tank lifts the float and closes the shut-off valve, the pump will force the water up through the branch pipe and into the milk can until its weight pulls the mill out of the wind. A small pin hole lets the water leak slowly out of the can and its lightened weight will permit the mill again to come into the wind.

## Harness Scrubbing Board

In overhauling harness, first take it apart and make the necessary repairs. Then, to clean it, allow it to soak thoroughly in a washtub of warm water containing a handful of washing soda.

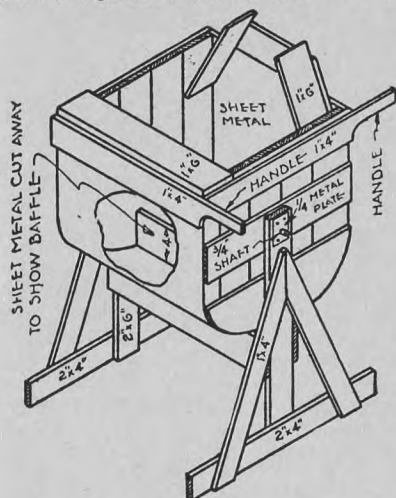


When taking it out, a piece at a time, to scrub clean, this scrubbing board is a great help. The water drains back into the tub. Apply the harness oil when the harness is still wet and rub it in well. As the moisture dries out, the oil penetrates still further. Drop the oiled pieces on top of each other, so that any oil that drops off from the top pieces will drip on to the lower pieces. More than one application of oil can be made if the leather will take it.



### Rocker-Mixer

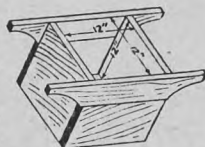
This cement mixer does the job easier than it can be done with the usual mixing box. It is operated by rocking back and forth. The dimensions of the various pieces are given in the sketch. One ad-



vantage is that the concrete is dumped directly into the wheelbarrow. Note that inside at the bottom there is a baffle board which greatly hastens the mixing.

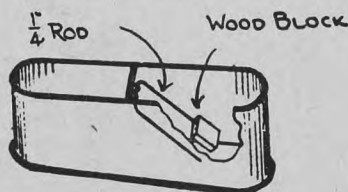
### Concrete Mixing Aid

In mixing concrete, all materials, including water should be accurately measured for every batch. A bottomless frame, which holds 1 cubic foot, is just the thing to measure sand and pebbles. A pail marked off on the inside to indicate gallons and half gallons is handy for measuring water.



### Tell-Tale Tank Float

It is very convenient to be able to tell the water level in a large supply tank, especially where it is up in the barn mow. The diagram shows how to arrange a simple marker worked by a float in the

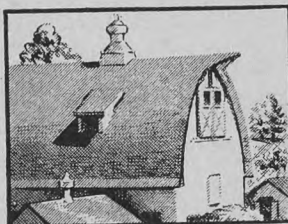


tank. The float was made from a light 2x4 about eight inches long, coated with hot tar and fastened to a one-fourth inch iron rod, bent into a U-shape and hinged to the cross brace on the tank so that one arm moved up and down on the outside of the tank. If desired, an arc could be painted on the tank and marked in any desired units.—I.W.D.

# How to Safeguard Your Farm Profits

One of your most valuable assets is the group of buildings that shelter your stock, protect your crops and machinery and provide a home for your family. They are the basis of your farm profits. Use the winter months to advantage by safeguarding these buildings from the hazards of fire and weather—remodelling them for more efficient, more economical operation. You can do the work yourself with Johns-Manville Building Materials. They're designed for speedy application—easy installation.

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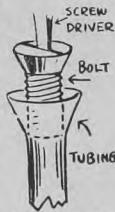
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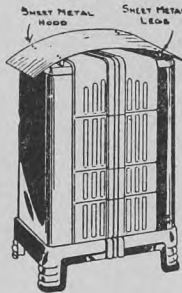
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## Flares Gas Line Tubing

When gas line tubings break on the farm engine or tractor, it is necessary to re-flare the coupling joints. This can be done by grasping the tube firmly in one hand and revolving the tapered head of a common stove bolt of correct size inside the tubing. A screw driver is used and a very neat even flare will result.—A. S. Wurz, jr., Rockyford, Alta.



## Cap Over Heater



Not being satisfied with the performance of my circular heater, I took a piece of metal, curved it as shown, riveted some short legs under it, and fastened it over my heater. Before, the heat would go straight up to the ceiling. Now, it is thrown out to the side before rising, and seems much more

effective in heating the room at living height.—I.W.D.

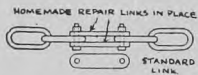
## Sack Protects Waterer

The diagram shows my way of preventing the hens from roosting on the water fountains and making the water unfit for drinking purposes. I simply take a gunny sack, slip it over the fountain, and hang it up to the ceiling. I've had no further trouble.—I.W.D.



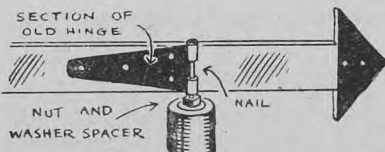
## Chain Repair

Often a chain will break at a very inconvenient time. Much delay can be avoided by the use of a simple homemade repair link in place of a standard link, made of two pieces of strap metal and two short bolts. Use a drill to make the holes in metal. A few sets of these ready made will come in handy.



## Wind Direction Indicator Bearing

One of the easiest and quickest ways to make a bearing for a wind direction indicator is to use part of an old



hinge. It is riveted on the arrow and a

spike is driven through the loop into the top of the post. By putting on a nut and washer the bearing is held up from the post far enough to allow freedom of motion.

## Repairing Drill Wheels

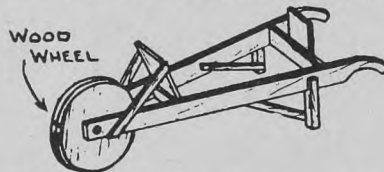
The wheels on my seed drill were badly worn, but with very little expense I was able to repair them. I took the tires and rims off. With a hollow auger the spokes were cut down to remove the decayed parts. Large washers



were put on as shown and the rims were placed on again. The tire should now fit very tightly, but if not, put two washers instead of one, on the spoke ends. My repair job has lasted two years now and looks good for another couple of years.—B. H. Markosky, Innisfree, Alta.

## Hauls Firewood

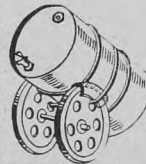
I made a small wheelbarrow for carrying wood into the house, out of scrap lumber. I can load this in the woodshed, push it all the way into the house, and then unload it into the woodbox. I made the wheel out of two thicknesses of inch board nailed together at right angles, cut out in a 12-inch circle, and with a small piece of flat iron on each side to



act as a bearing. I tacked a piece of old inner tube around the edge of the wheel to keep it from picking up dirt. A few boards tacked on top of the wheelbarrow permits it to be used for other purposes.—I.W.D.

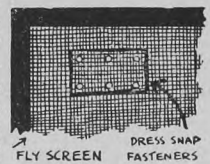
## Handy Barrel Tipper

The diagram shows a convenient outfit I made so that one man can easily handle a full barrel of gasoline or oil. I took the two flywheels and crankshaft off a 1 3/4 horsepower gas engine and bolted the barrel to them as shown by putting a one-inch strap iron around the barrel and through the wheels and drawing it up with bolt and nut. Before tightening this up I slipped pieces of old tire casing between barrel and wheels to prevent rubbing the barrel and to make it easier to hold the barrel solid. If engine flywheels are not available, two small wheels of any kind can be put on a shaft of the proper length and be used in the same way.



## Mending Wire Screen

A torn or broken screen can be quickly and neatly mended by using ordinary dress snap fasteners. Cut the patch and put it in place. One part of the fastener is placed on one side and the other on the opposite. Simply press them together through the screen and patch.



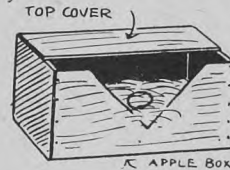
## Paint Brush Wiper

A wire bent as shown and slipped under the top rim of an open can of paint will be found to be a great convenience for wiping off the excess paint from the brush after it is dipped each time.—Paul Tremblay, St. Paul, Alta.



## They Roost Elsewhere

This illustrates a good hen's nest that will not allow hens to roost on it. It is made of an apple box and several boxes may be placed end to end and covered with a long board. The hens do not have a comfortable place to roost on the V-shaped front.—James H. Bride, Pierson, Man.



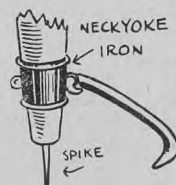
## Broom to Sweep Snow

An ordinary broom can be used for cleaning walks of fairly deep snow and slush by stiffening it with a piece of plywood. Bore two rows of six 1/4-inch holes and lace through the broom with heavy cord.



## Improvised Cant Hook

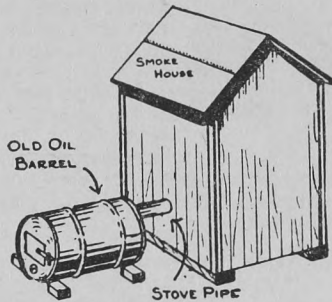
In getting out the wood supply a cant hook often comes in handy. One can easily be made by using the centre iron from an old neckyoke. The hook can be made from a piece of old iron. By allowing the handle to project below the hook the iron spike can be eliminated. Or a piece of iron can be rivetted on the side next the hook, as in a boughten cant hook. It is bent out at the bottom to face the point of the hook.





### Meat Smoker

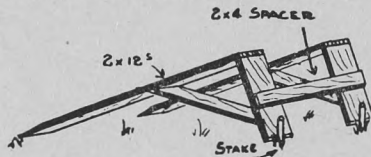
The diagram shows a method for smoking meat which is much better and safer than the old-fashioned way. A



steel barrel or oil drum is placed at one side of the building. Run one or two lengths of stovepipe from the barrel to the smoke house. A door at the far end of the barrel admits air and wood and should be so arranged that the draft can be almost entirely closed after the fire is started. This keeps the meat from getting too hot and prevents fires which occur so frequently when the fire is built in an old kettle or tub.

### Truck Unloading Hoist

Here is a diagram of a hoist for a truck to unload grain. Two of these are set, one in front of each truck front

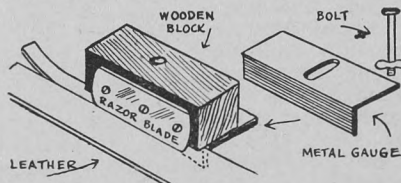


wheel. Drive up on it, then block the rear wheel or set the brake. This raises the front end of the truck and makes it much easier to unload grain into the elevator. The drive-on part is of 2x12 about 5 feet long, the supporting parts 2x12, 2 feet long, while the brace is also 2x12 about 2 feet long.

Note by editor—It would seem necessary to have a rod or heavy twisted wire parallel to the brace to prevent the shove from wracking the framework. Also that the side bracing should be of two crossed braces instead of the one shown. —I.W.D.

### Belt Lace Cutter

A block of hardwood with a safety razor blade fastened to its side with



wood screws, and with a sheet metal gauge at the bottom, will make as good a belt lace cutter as you can buy. By pushing the gauge back and forth, wide and narrow laces can be cut with great speed and accuracy. —W.S.A.



## FARM IMPROVEMENT LOANS

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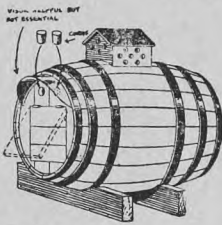
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## Barrel Doghouse

If you have a good barrel around the place it can be remodelled into a good doghouse. It is rain proof, snow proof, warm in winter and cool in summer. Any long haired dog can be kept in it in cold weather. The door has double acting hinges at the top to swing in or out. The visor is optional and corks can be put in the holes under it in cold weather.

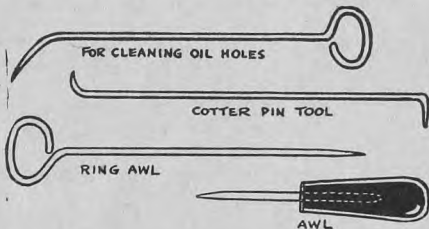


## Handy Depth Marker for Bit

Where several holes are to be bored the same depth a strip of adhesive tape wrapped tightly around the bit or drill at the right place will show when the hole is the proper depth and will not slip.—I.W.D.

## Tools from Fork Tines

Most farms have a broken old fork or two in the scrap pile. Here are some useful tools that can be made in a few minutes from the tines. The one for cleaning out oil holes has a piece of wire beat a mile. The cotter pin tool is useful in many ways. The awls are very useful in the workshop for making



small holes and scratching lines on metal or tin. If you have no forge you can heat the tines in the stove and bend them.—George Z. Merkley, Springwater, Sask.

## Leather Knife from Old Hand Saw

I made this leather knife from a piece of the blade of a discarded hand saw. I cut it out with a cold chisel and then worked it to shape with a file. I ground the cutting edge with an emery and finished the edge on an oil stone. It is very useful for cutting and trimming leather when fixing up the harness.



## Good Staple Puller

An old worn-out mowing machine guard will make a good staple puller. Drive the point of the guard through the staple between wire and the post.

## Awl from Valve Stem

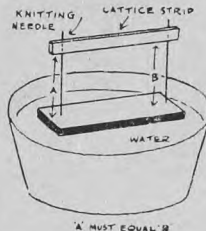
Warren G. Parker, Birch River, Man., sent this gadget in and the artist drew the sketch from the original article. "Just remove the valve cap from a valve stem," he says, "then drop the nail



point through the valve cap and put back on the valve stem again. Sharpen the nail, put on a handle, and you have a very useful awl."

## An Improved Level

This level is made from a short block of clear white pine, two knitting needles or straight wires and a 3-ft. length of  $\frac{1}{4}$  by  $1\frac{1}{2}$ -inch lattice strip. The white pine board is 20 inches long. The sketch shows the manner of assembly. This outfit, once checked to make sure the lattice strip extends parallel with the pine board, will float level on any container of water and will be surprisingly accurate. The top strip may be moved slightly up or down one wire to maintain accuracy.—Dale Van Horn.



tends parallel with the pine board, will float level on any container of water and will be surprisingly accurate. The top strip may be moved slightly up or down one wire to maintain accuracy.—Dale Van Horn.

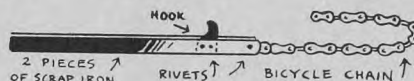
## Magnet as Pincushion

In the U.G.G. elevator I noticed an excellent pincushion. It is a magnet from an old Ford car hanging on the wall. No need to stick the pins in it. Just throw them at the magnet.—Henry D. Falconer, Glentworth, Sask.



## Improved Pipe Wrench

A couple of pieces of scrap iron and a length of bicycle or motor-cycle chain are all that is required to make this pipe wrench. The two pieces of iron should be about 15 inches long and the chain about the same. The chain is passed



around the pipe and then anchored on the hook.—Paul Dannewald, Stettler, Alberta.

## Solder Into Ribbons

To make solder into thin ribbons which are a substitute for wire solder for fine work, place the ladle of molten solder against a revolving wheel and pour. The slower you pour the finer the ribbon.—Grant Macleod.

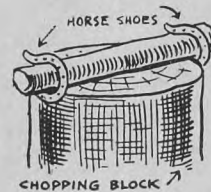


## Wood-Carrying Sling



Here is a handy device which enables me to carry twice as much stovewood as with arms alone. The sling is made of gunnysack or canvas fastened to two round sticks, one of which serves as a handle, while a strap fastened to each end of the other goes over the shoulder and is adjusted to suit the user.—I.W.D.

## To Keep the Wood from Flying

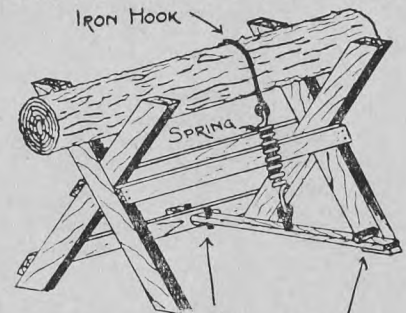


to your person is eliminated.

To keep wood from flying in your face when you are cutting it, fasten two horse shoes to your chopping block as shown. The wood will not fly and the danger of causing damage

## One-Man Saw Buck

Make out of one-fourth inch or heavier rod a hook large enough to go over the largest log you are likely to saw, fasten the hook eye to one end of a cultivator or other fairly strong

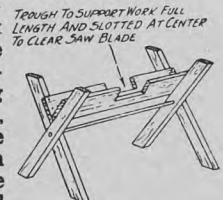


WOOD PEGS

spring, and the other end of spring with a rod or chain to a rod or 1x4 stick hinged as shown to a brace on the far side of the buck. Drive one or more spikes or pegs into the lower part of the buck leg on the near side, and adjust the length of chain so that pushing the 1x4 down and under the peg or spike will stretch the spring and hold down on the log. It sure works fine.

## Sawbuck That Will Not Pinch

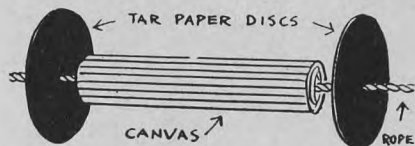
Here is a non-pinching sawbuck which will be found very convenient for sawing cordwood or posts, as these can be partly sawn through in the middle notch, and then are properly supported when pushed out so the stick can be cut completely through. Try this, as you will find it a big improvement over the old-fashioned type.





### Storing Binder Canvas

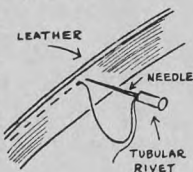
When the time comes to store the binder or combine canvases be sure to put them where the mice can't get at



them. A very simple and effective way to do it is to thread the canvas on a rope with a tarpaper disc at each end. Mice will not crawl beyond this barrier.

### Use For Tubular Rivet

The difficulty of pushing a large needle through leather in making small harness repairs may be overcome by slipping a tubular rivet over the end of the needle. The rivet is not injurious to the thumb and the necessary pressure can be easily applied. — Calvin Newman, Forward, Sask.

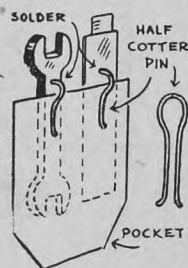


### Support For Kettle

A simple but very convenient support for the large kettle used for heating water and rendering lard can be made from an old auto demountable rim. Cut three strips of heavy strap iron about 15 inches long and weld or bolt them solidly on the inside of the rim to form the legs. If preferred the rim from an auto can be used by cutting out the spokes next to rim. Such a support is easily moved and gives a firmer support than one made of stones or bricks.—I.W.D.



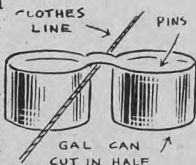
### Pocket Clip from Cotter Pin



A cotter-pin cut in half will serve as a pocket clip for special tools and mechanics' gauges. Simply cut the pin in half at the eye, drill a small hole in the tool, insert the cut part of the pin and solder in place. This type of clip is unbreakable.

### Clothes Pin Holder

A tin can cut in half, with two inches of tin left between the two halves to form a slide on which they slide along the clothes line makes a clothes pin holder that is always close at hand and easy to reach. The sharp edges should be rolled over to prevent cutting the hand.—A. S. Wurz.



### Sawing Nails

NICK BACK OF SAW WITH FILE



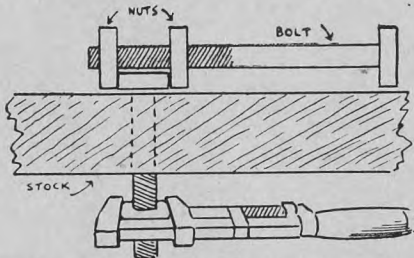
Sometimes, say in removing a door or window, there are nails which are hard to get at to draw out and the material may be damaged in removing it. It saves trouble and damage if the nails can be sawn. Take an ordinary three-cornered file and file a few teeth in the back of the handsaw. About a dozen teeth will do.—C. Leder, jr., Neerlandia, Alta.

### Tape Protects Work

When a file is used for fine work, there is often the danger that its other surface may come in contact with some other part of the job, scratching or marring it. This danger may be avoided by covering the idle side of the file with a strip of adhesive tape, which is easily removed when the work is finished.—Edwin Unger, Mayfair, Sask.

### Improved Wrench

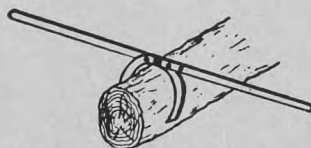
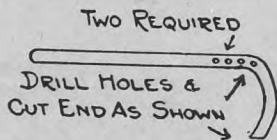
When you find that the bolt to be removed is turning, and you have only one wrench, look in the machine box for a bolt, fit it with two suitable nuts, and use it for a substitute wrench. You will find that it works perfectly. The



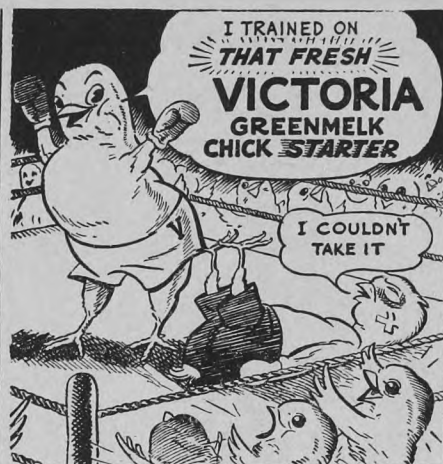
nuts can be adjusted to the size of the nut to be removed by screwing them apart or together.—A. S. Wurz, Rockyford, Alta.

### Two-Man Log Lifter

A handy two-man log lifter can be made from two shovel shanks off a discarded cultivator. Each shank is drilled



as shown with four holes to accommodate both large and small logs. The connecting bolt should fit in to the hole easily, and be fastened with a bolt and wing lock nut, so that it can be loosened and spun off by hand without having to look up a wrench.—I.W.D.



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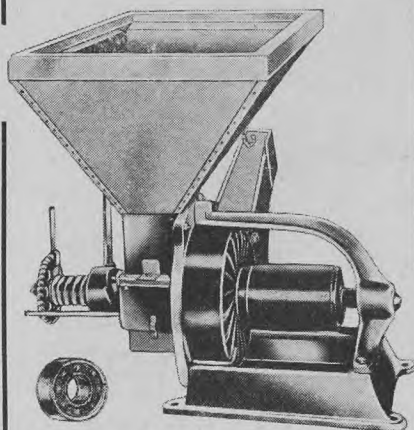
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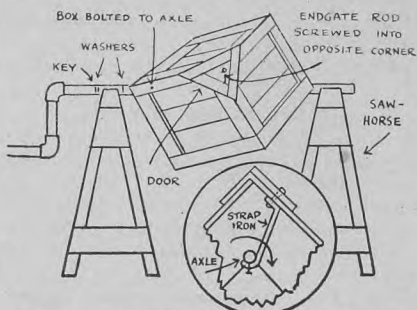
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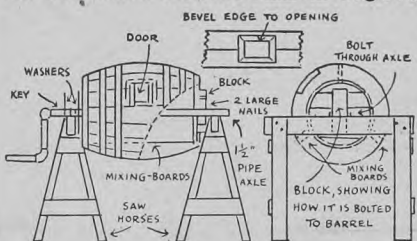
## Homemade Dusting Machines

The first consideration in making a dusting machine for treating grain for smut is to have it dustproof. Three types are shown, each mounted on a pair of saw-horses, 32 inches high.

The box is about two feet square, which will hold a charge of a bushel and requires 30 revolutions per minute for 1½ minutes per treatment. The axle is 1¼-inch pipe six feet long. To make the bearings take a block, preferably of hardwood, 2x4x8-inches and bore a 1½-inch hole in the centre of the 4-inch face. Then rip the block lengthwise through the centre of the hole so that each half is 2x2x8 and has a half round bearing surface across its face for the axle. Bolt these to the saw-horses. The washers are held against one bearing with cotter pins passing through holes drilled in the axle. For the opening, cut away about nine inches from one of the free corners. The door is held in

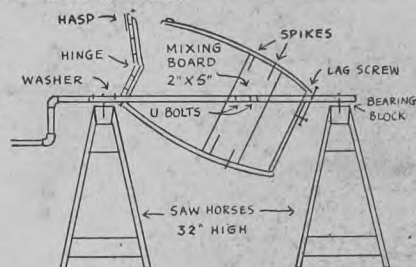


place by an end-gate rod screwed into the opposite corner and comes through the door about three inches off centre so that the door can be rotated out of the way when filling. Two pieces of ¼x1-inch strap iron are bent and attached to the box and the axle as shown in the insert illustration. These force the box to turn with the axle. The bolts which attach the box to the axle are about six inches from the corner of the box where the axle runs through it.



This duster is made from a clean wooden oil barrel. Instructions for mounting the box duster apply largely in mounting this type. The axle is four feet long. Three bits of 1x4-inch board, the length of the inside of the barrel, and shaped to fit the bulge, are spaced equally around the circumference with the door in the middle of one space. They are fastened in place with iron brackets. The barrel is anchored to the axle by bolting a piece of 2x4 to each end of the barrel and then putting a bolt through the 2x4 and the axle. For the door opening select two wide staves and cut out, leaving a bevel for the door to fit against and also leaving about

an inch of each stave for rigidity. Tack pieces of discarded inner tube around the opening to make it dustproof when the door is closed.



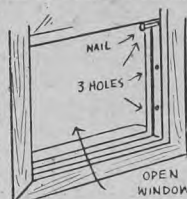
This duster is made from an old steel oil drum or a 50-gallon barrel. One half of one end is cut out. A wooden head is made hinged in the centre and attached as shown. Make dustproof with strips of old inner tubes. The door is held closed by a hinged hasp. Bolt a 2-inch reinforcing block to the opposite end for the axle to pass through. The drum is anchored to the axle by two large lag screws six inches long, screwed into the false heads through holes drilled through the barrel and axle. A baffle board, 2x8 inches, is spiked across the inside of the drum about two-thirds of the way back from the door, placing it so that it will be up and down when the drum is in filling position. The bearings are the same as in the other types and no top half is necessary.

These types of dusting machines are designed by the Dominion experimental farms system and are therefore approved by it.

## Safety Window Catch

When there are small children around

the home it isn't safe to use just any old thing to prop up a window. Instead, bore three gimlet holes as shown in the sketch and an ordinary nail will hold up your window at



three different openings, with no danger of broken little fingers.

## Concrete Lantern Base

Fitting your lantern with a concrete base will do much to prevent it from being accidentally overturned, especially when it is being used outside. Make a form of inch boards about 12 inches square, fill with cement mortar, and insert the lantern, making sure not to cover the filling hole. The form can be removed in two or three days.

## Knob For Pot Lid

When the wooden knob pulls off your pot lid just take a cork one-half inch in diameter, drill hole through the centre and insert a long rivet through both cork and hole in lid, place on washer and clinch rivet so it will not pull out. This knob does not get hot, therefore saving many burnt fingers.





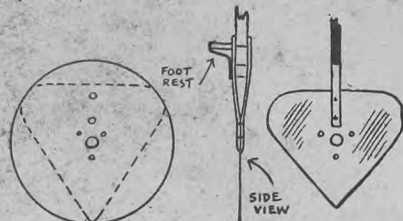
## Holding Table Together

If the extension table keeps pulling apart because the locking appliances are out of commission here's what to do: Take two ordinary sash locks and put them on the underside of the top as shown, and your troubles are over.—H. W. Reddicopp, Abbotsford, B.C.



## Hayknife From Old Coulter

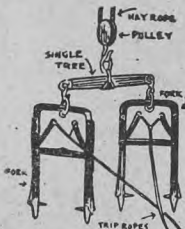
To make this hay knife cut an old 15-inch plow coulter into the V-shape shown. Heat and pound out until flat and fairly sharp, when it can be finished on a grindstone. The hardwood handle



is 1 1/4-inch thick and 32 inches long, and is tapered at one end to approximately the same thickness as the knife. The foot rest is four inches of one-half inch pipe with a bolt through it and supported by a piece of strap iron. The D-handle is taken from an old spade. It costs nothing to make and is far superior to any knife I have ever bought.—Eric C. Holmes, Dollard, Sask.

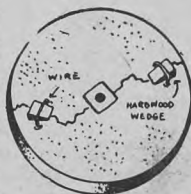
## Handling Short Hay

When drawing in hay that will be unloaded with a hayfork outfit, trouble is met in getting good forksful if the hay is short. One way to help overcome the difficulty is to use two forks of the same type mounted on a whiffletree. The trip ropes are tied together. The two forks will lift more than twice as much as one in very short stuff.



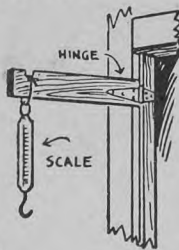
## Repairing Grindstone

To repair a split grindstone, bore two pairs of holes in each section directly opposite each other. Make a mixture of one part cement to two parts of clean fine sand. Moisten the stone and cement the two parts together and allow to dry slowly. Then wire the stone through the holes. To tighten the wires use hardwood wedges shoved under the wires with the thin edges pointed toward the axle.—D. H. Edgeworth.



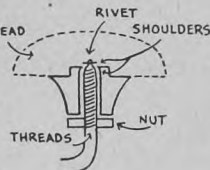
## Support for Scales

Ever wish for a handy place to hang the scales when weighing up a few chickens? This cut illustrates how some farmers solved the problem. When not in use the hinged member swings back out of the way.



## Repairing a Brace

After a lengthy tough service, the head on my bit brace became tight and would not turn freely. I unscrewed the hardwood head and found the shoulders worn out. To repair this I threaded part of the brace rod and screwed a nut on, assembled the rest of the parts back and the brace worked well again as the pressure is now on the nut.—T. T. Drowniak, Tolstoi, Man.



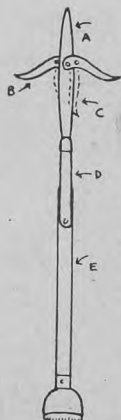
## Homemade Wheel Scrapers

This illustration shows how to use discarded rolling coulters or discs from an old disc harrow to make mud scrapers for the wheels on farm machines. The edge of the disc may be shaped on an emery wheel to fit the wheel rim. The disc is bolted to a piece of 2x4 fastened to the implement frame.



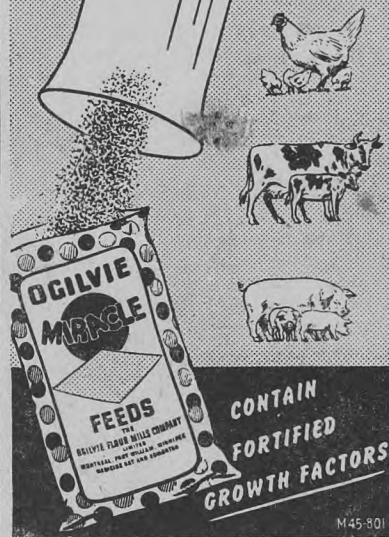
## Hook for Pulling Hay

This hook for pulling well packed hay from a stack, and doing it easier than it can be done with a fork, is made as follows: A is a piece of flat iron, 18 1/2 inches long, 1 1/4 inches wide and 1/4 inch thick, pointed at one end and fastened to a wooden handle E about 32 inches long. The claws B are about 5 1/2 inches long, and have a small pin which holds them in place when they are open. D is a strapped ferrule, to strengthen the joint between the iron and wooden handle. A D-handle is placed on the end of the wooden handle. When the device is pushed into the hay the prongs close and they open with the first tug. It is an easy matter to get the hook out of the hay. Simply give it half turns, first one way and then the other, while shaking it. We use one and it works fine.—Marian Pilchowski, Rama, Sask.



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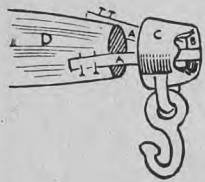


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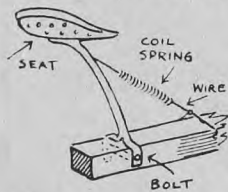
Be sure! Don't take chances with ordinary feeds. Your leading feed dealer carries a complete line of "Miracle" Feeds... also "Miracle" Feed Supplements.

## Securing Single-Tree Irons



Are you bothered with cock-eyes coming off and getting lost? Then here is an idea which will save you trouble. Take a little strip of tin A about  $\frac{1}{2}$ -inch wide and 8 inches long. Thread it through the cock-eye C and over the wedge B in staple fashion. Then drive the cock-eye on the single-tree D in the usual way. Now drive shingle nails through the tin on each side and into the single-tree.

## Repairing Spring Seat



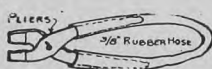
Some farmers probably broke spring seats last summer. Well, here is a way to make your own spring seat. Take a pipe or rod and split it at the bottom. Shape the two parts that have been split as shown and then attach as shown. Take some wire and make a cable with a coil spring attached in the middle and fasten it as shown. There you have a spring seat that will give satisfaction.

## Theft Proof Grease Cup

A grease cup can be fixed so that it cannot be unscrewed with pliers or wrench and is almost proof from loss by vibration. Take a tappet or other stiff spring just large enough to slip over the hexagonal shank and cut a section long enough so it will be somewhat compressed when the cup is screwed down into place. Remove the grease cup cover, drive a tapered square drift or key down lightly into the oil passage and screw the cup into place by using a wrench on the key. The spring prevents using a wrench or pliers on the squared surface of the shank, and the cup can be unscrewed only by using the squared drift from the inside, a tool the would-be thief is not likely to have on hand. The friction of the spring also prevents vibration from loosening the cup so it will not be lost.

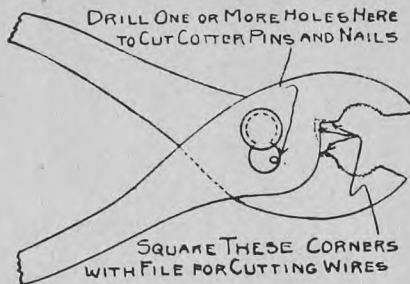
## Insulating Pliers

A short length of three-eighths-inch rubber tubing slipping over the handles insulates any pliers so it can be used for handling spark plugs, ignition cables, electric wires of not too high a voltage and the like. It is much better than the usual method of wrapping with friction tape, but is not safe for handling high tension wires.—I.W.D.



## Improving Common Pliers

Cheap six-inch pliers are generally used only for holding, but an  $\frac{1}{8}$ -inch hole drilled as shown makes a convenient way to shorten cotter pins and nails, etc.

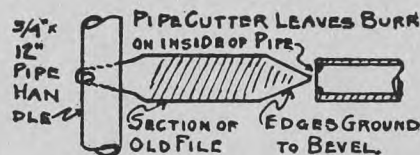


## IMPROVING COMMON PLIERS H-102

Also by filing back the jaw shoulders, bare or insulated wires can be cut very nicely. They can also be used as hand vices by filing notches near the end of the handles and then slipping on a loop or wrapping tightly with wire after the object has been grasped.

## Homemade Pipe Reamer

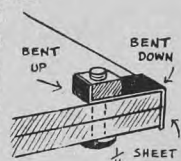
The diagram shows a simple but effective pipe reamer for removing the burr edges inside a pipe cut by the wheel pipe cutter. It is made from an old file,



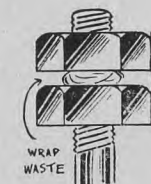
and for heavy work may be turned with a wrench down close to the cutting edge.

## Lock-Washer

An oblong strip of one-sixteenth-inch sheet iron used as a washer with one end bent up on the nut and the other end bent down against the sides of the pieces held together, will make a very efficient and cheap lock-washer.—W.S.A.



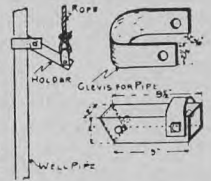
## Lock Stud for Stud Bolt



Very often we have a stud bolt to put in or take out and a pipe wrench is not the tool for the job. Screw a nut on the bolt, not necessarily to the end of the thread, then a second nut. Before they come together wrap a wisp of cotton waste or two or three wraps of soft string between the nuts. Then tighten the two nuts against each other. The waste throws the two nuts out of step and you secure a good lock. To insert stud, use your wrench on the top nut; to extract, on lower one. The nuts unlock quite easily.

## Well Pipe Holder

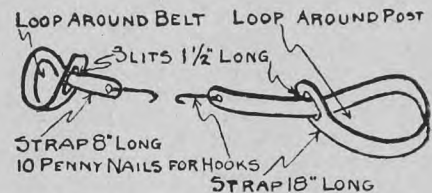
Here is a plan for a holder which we have used for several years for taking the pipes out of wells up to 140 feet deep. I made my holder from a square pipe used in a binder frame, although any two-inch square pipe will do. The clevis which goes around the pipe must be quite heavy, not lighter than  $\frac{3}{8}$  by  $2\frac{1}{2}$ -inch wagon tire. I use two of these holders in taking pipes out or putting them back, one as holder and the other as lifter.



It would seem desirable in putting the pipe back, to have a hook on a long rod or pole to reach down and lift up the lower clevis so the holder can be pulled up the pipe for a fresh hold.—I.W.D.

## Handy Skinning Device

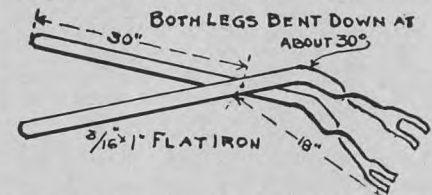
This device makes it easy for one man to skin mink, muskrats, squirrels, rabbits, etc., either for meat or fur. After opening the pelt, one hook is fastened into the skin and the other to a leg or



to the carcass and the desired pressure put on while the hands are free to work the skin loose. If the flesh tears easily, a loop of stout cord can be doubled and put around the carcass and the hook fastened into the looped end.

## Handy Clinker Tongs

Here is a handy tongs for removing clinkers from the furnace. It is made



from two pieces of 3-16 by 1-inch flat iron, 48 inches long, with the ends split into claws, given a quarter twist, bent down at an angle of about 30 degrees so as to reach down in front of the furnace door, and finally fastened with a one-fourth inch rivet or stove bolt. It costs very little and works better than those on the market.—I.W.D.

## Holding Rod in Place

If you want to keep a rod from moving endwise, and it has no key hole drilled in it, notch the rod on each side with a hack saw and drive in a slotted key cut out of heavy tin or sheet iron. Perhaps you have tried that, but have you tried putting two hack saw blades in the frame to make the notch wider?

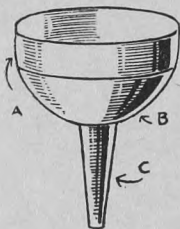




### Twine Cutter

Here's another use that can be made of an old shade fastener. Nail two bits of board together as shown. On the bottom drive a nail to hold the ball of twine. On the side place the fastener after flattening and sharpening it.

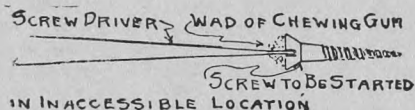
### Funnel From Headlight Reflector



This funnel is made from an old headlight reflector. A is a piece of tin about two inches wide, soldered to the reflector. The join in the tin should also be soldered to prevent leakage. B is the reflector. C is another strip bent to form a spout soldered together at the joint and then on to the reflector so that the socket opening leads into the spout.—Wm. J. Kehler, Altona, Man.

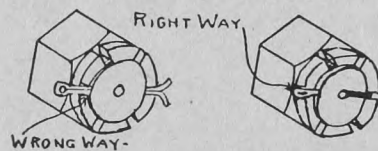
### Screw in Difficult Place

A wad of chewing gum on the screwdriver will often hold a screw so it can be started in a place that is hard to reach. Spring attachments are available for screwdriver blades for this purpose.



### How to Use a Cotter Key

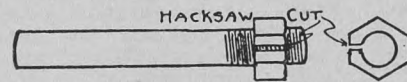
Many farmers do not know how to put in cotter keys in connecting rod bolts and other fast moving parts. The



proper way is that used by all good garage mechanics.

### To Hold Threaded Bolt

Here is a simple way to hold a threaded bolt in the vise while the

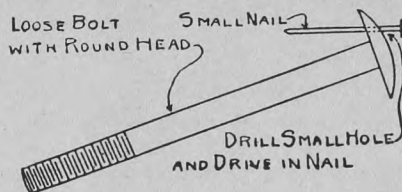


SPLIT NUT HELD IN VISE WILL GRIP BOLT WITHOUT DAMAGE TO THREADS

other end is being threaded. Make a hacksaw cut in one side of a nut which fits the bolt, screw it on and clamp it in the vise, and the bolt will be held securely without damage to the threads. Smooth rods and tubing can be held in the same way.—I.W.D.

### Keep Loose Bolt from Turning

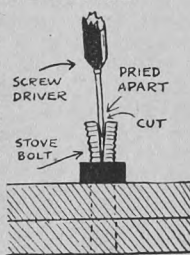
The diagram shows a simple but very effective way to hold a loose carriage bolt from turning. Simply drill a small hole through the head at such an angle that a nail driven part way will enter



solid wood. This is especially helpful with body bolts on autos where you cannot get to the head and the nut at the same time.

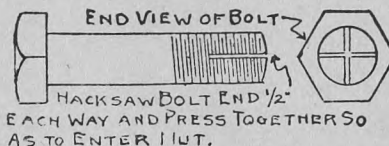
### Locking Stove Bolt Nuts

Small diameter bolts such as stove bolts can be effectively locked by slotting the end of the bolt and prying the halves apart with a screwdriver. When it is necessary to remove the nut it can be simply unscrewed and it will force the parts together again.—A. S. Wurz, jr., Rockford, Alta.



### Tapered Thread to Clean Nut

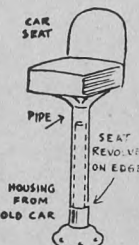
Quite often a nut becomes battered so that the bolt threads will not enter. The diagram shows a simple way to



overcome this trouble and straighten out the threads in the nut. With hacksaw make cuts at right angle in the end of the bolt and draw the parts together in the vise so as not to damage the threads. The tapered thread will enter easily and clean out the threads in the nut.—I.W.D.

### Tractor Seat

I have enclosed a diagram of a tractor seat I made from parts of an automobile. I took half the housing from an old car and cut off enough to leave it 26 inches from base to top. Then I took a piece of pipe which just fits over the axle part and revolves on the housing. The length of the pipe is 36 inches. I sawed one end four ways six inches down on which I bolted a car seat. The back of the seat will fold forward when not in use.—Sidney Seaman, Claresholm, Alberta



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CANADA AND UNITED STATES

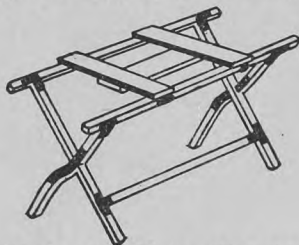
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CECIL C. KENT,  
Consulting Engineer  
Fellow, the Patent Institute of Canada

F. B. FETHERSTONHAUGH, K.C.  
Of Osgoode Hall (1890-1945)

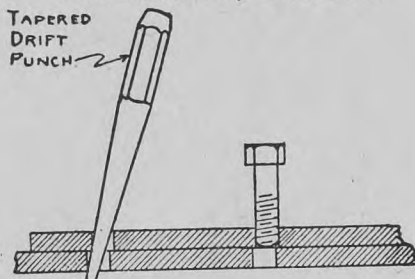
### Bench from Camp Cot

There are usually three of these sections in an old folding camp cot. Take two of them and make the top for them, as shown, out of bits of board. There are clamps on the outer ends of the cross pieces and these determine how



high the bench will be. The closer the side pieces are the higher it makes the bench. This makes a splendid bench for the wash tub, etc.—Geo. Ray, Winnipeg.

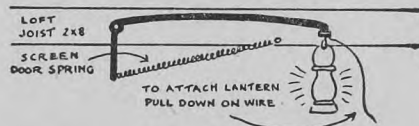
### How to Line Up Bolt Holes



A tapered drift punch is very handy for lining up bolt holes when putting machinery together. An old fork or digger tine may be used in a pinch, but bends too easily for heavy work.

### Lantern Hanger

Mrs. O'Leary's cow couldn't kick this lantern down. The hanger was here when I came to the farm and I wouldn't be without it. All that is needed is a 1/4-inch rod flattened out where it is spiked or bolted to the joist. On one end



is a harness snap to hold the lantern. An ordinary screen door spring furnishes the tension. One end is fastened to the bottom edge of the joist and the other to the end of the bent rod.—Henry D. Falconer, Glentworth, Sask.

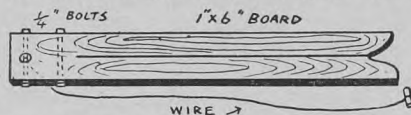
### New Type Funnel



After spilling lots of gasoline and kerosene filling lamps which have the filler plug on the side, with a straight funnel, I decided there was a better way, so I built a funnel with the spout set at an angle. The result is that when the funnel is set for filling, the bowl of the funnel is level instead of half upset as a straight funnel would be.—G. F. Hinchliff, Ruthilda, Sask.

### Tar Paper Cutter

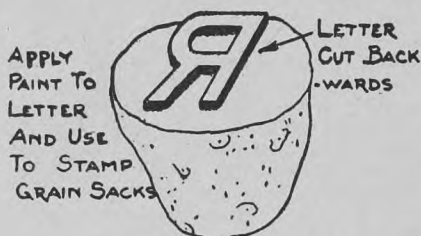
This paper cutter is made from a piece of 1x6 with a saw cut down the middle nearly to the opposite end, where it is strengthened by two 1/4-inch bolts. To the middle of one of these bolts a piece of strong, fine wire is fastened. The board is placed on the paper with



the wire underneath and then the wire is pulled up through the slit by a wooden block which is fastened on the end of it.—Arnold Smith, Peebles, Sask.

### Grain Sack Stamp

Here is a handy stamp for initialling grain sacks and other things which are likely to be mixed up when used in common. Take a potato and cut the



initial of your last name, having the letter raised and reversed as shown. Brush on heavy black paint or touch it to the paint on a board or pad, and then apply it to the sack.

### Home-made Clinkers

To make a set of clinkers for the boy's boots take a large washer, put it in the vise and saw in two with the hack saw. Then drill three holes in one of the halves, round the corners with a file and nail on to the heels. Clinkers can be made for the toes of the boots from another washer.—Otto Sanger, Allans, Sask.

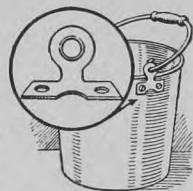


### Cover for Cistern

A concrete cover for the cistern will keep out all worms or insects and prevent any surface water from dripping through. A good way to ensure a tight fit between wall and concrete cover is to spread a little cement mortar on top of the wall, lay waxed or other waterproof paper on the mortar, then three or four men lift the cover and set it down on the paper strip. The mortar will conform to any irregularities in the under surface, and the waterproof paper will prevent permanent adherence. It is not necessary to have the cistern air tight, but all openings should be protected by fine copper screening so mosquitoes or other insects cannot enter.—I.W.D.

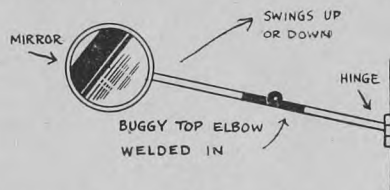
### Water Pail Repair

Often the lug of a water pail gives out. This shows an easy and effective way to replace it. An old window shade fastener is riveted on the pail in place of the damaged lug.



### Collapsible Mirror

Simply take an old buggy top elbow and weld it to your mirror rod as shown in the sketch. This saves a lot of



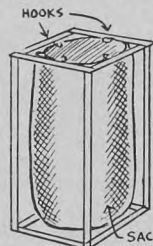
trouble when driving in narrow alleys or through a narrow door. Just swing it up or down as required.—Jacob H. Schmidt,

### Smelly Cistern Water

When the water in a cistern develops a bad smell, it can be renovated so as to be satisfactory for laundry purposes by fixing up a good sand filter with at least 24 inches of sand and six inches of pea-sized charcoal, and pumping the water through this several times and letting it run back into the cistern. The thorough aeration and the action of the charcoal will remove the offensive smell and much of the color. Be sure all openings are covered with not coarser than 16-mesh screen, and the water will not likely give any further trouble. Clean out and wash the filter before it is used again.—I.W.D.

### An Ideal Waste Container

The accompanying sketch shows how in twenty minutes a man can nail together an ideal, movable waste container, very useful in a house where kiddies are always cutting paper dolls or model aeroplanes—and even in the basement of the home, which is usually very untidy. Merely nail a few inch-boards together in a complete rectangle, to provide the holder; then screw in a hook on each side, turned upwards, on which the sack may be suspended and kept open. This is very convenient.—Dale O'Hara.



### Dust Pan From Frying Pan

This dust pan never wears out. Take an old frying pan. With hammer and chisel cut off the front half. Hammer the bottom to a sharp edge so that the dust can easily be swept up.—A. J. Rogers, Stettler, Alta.



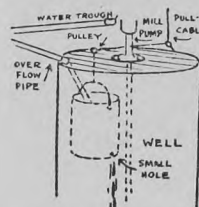


### Simple Camp Stove



I made this camp stove out of an old leaky washtub and a length of stove-pipe. But we do not use it camping. On hot summer days we cooked all our meals on it and even did some canning with it.—Margaret Jickling, Richer, Man.

### Windmill Cutout



With this device the overflow from the full tank is drained into a small oil drum or large can. The weight pulls the windmill out of the wind. A small hole in the can drains the water back into the well. The timing is controlled by the size of this small hole. It can be made large enough to release the mill into the wind every two hours or so. The receptacle must be large enough so that it will pull the windmill out of the wind when it is full.—Kenneth Clement, Donald, Alta.

### Bag Holder

This is the way to make a bag holder and filler out of an old 5-gallon cream can. Remove the bottom and then punch a half-inch hole near the bottom edge so that it can be hung on a wall or post. In the neck of the can punch three smaller holes, spaced evenly and into these holes insert belt hooks or hog rings. Clinch them, leaving the hooks on the outside of the can. By means of these hooks the bag is held firmly to the neck of the can and the bag is easily filled. The can may be hung high or low according to the length of the bag.—H.W.R., Abbotsford, B.C.



### Slotted Wedge Nail Puller

A great improvement over the common practice of using a scrap of wood to push under the hammer head when pulling nails, is a slotted wedge-shaped block of hardwood. The block can be pushed under the head to suit the length of the nail.

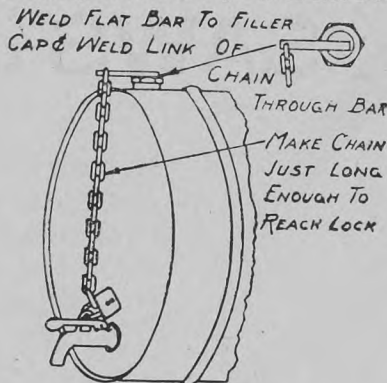


### Homemade Burlap Needle

The opener that usually comes with a can of sardines may be converted into a practical needle for odd jobs around the farm, such as mending sacks, harness, etc. Straighten the handle end, flatten and grind to a point. The slot in the key serves as an eye for the needle.

### Handy Gas Barrel Lock

The diagram shows how I have fixed my gasoline barrel so it can be locked to prevent thieves from stealing fuel either from the faucet or by siphoning it out at the filler cap by means of rubber tubing. I welded a piece of flat iron

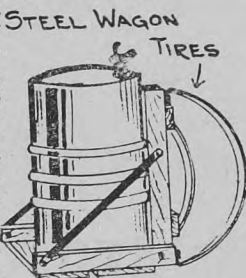


### GAS TANK LOCK

on top of the filler cap with a heavy chain just long enough to reach to the faucet. By locking the chain and faucet together as shown, one padlock protects both places, as the filler cap cannot then be unscrewed. The flat bar also helps to loosen the filler cap if it happens to stick.—I.W.D.

### Rack for Oil Drum

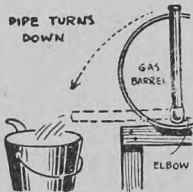
The diagram shows a handy rack for handling a 55-gallon oil drum. It is made of hardwood and fastened together with bolts, the rockers are from wagon tires, and braces are heavy strap iron.



The rack is made so that the barrel or drum stands upright until gas or oil is needed, and then is tipped over onto the rockers. This eliminates all lifting and makes it a one-man job.—I.W.D.

### For the Gas Drum

I have fixed up a device that makes lifting the gas barrel unnecessary. With 4 x 4 material a stand was made to keep the drum eight inches off the ground. I screwed a 2½-inch nipple on a ¾-inch pipe into the small end of the drum. To this I connected a ¾-inch elbow and 20 inches of ¾-inch pipe, threaded at both ends. I keep a cap screwed on the end of the pipe to keep it air tight. When I want gas I just remove the screw cap, turn the pipe to the left until the gas runs into the pail. To shut off, lift the pipe upright again and replace the cap.—Carl A. Tatroe, Sedgewick, Alta.



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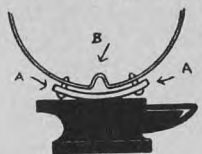
## Tightening Loose Wagon Tires



When a tire comes loose on a wagon wheel and you haven't time at the moment to get it reset you can tighten it by this simple method. Take a strip of flat iron an inch or so longer than the width of the tire, and cut V-shaped slits near each end. Then slip under the tire. The V-shaped tabs are bent over the edge of the tire and the ends of the strip down over the felloe of the wheel. —David Kerks Jr., Semans, Sask.

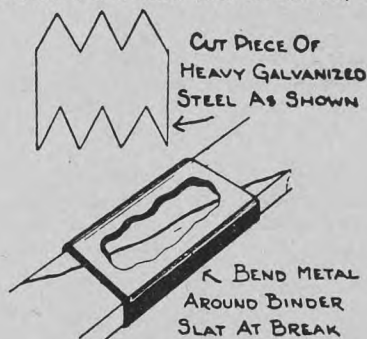
## Setting Buggy Tires

Now that the old buggy may be pressed into service again the tires may need setting. Take an iron about 12 inches long and an inch wide and about 1/8-inch thick and rivet two studs into it near each end as shown at A-A. Now use one of the holes in the buggy tire to slip over one stud. For the other stud you have to drill a hole. Measure out the amount of set needed and bore the hole accordingly—that is, wider apart than the studs are. Now bring the holes together just enough to fit over the studs by bending the tire up at B. Make the tire red hot at this point again and hammer the projection down flat and the tire is ready to put on the wheel. —D. M. Fehr, Muir, Man.



## Binder Slat Repair

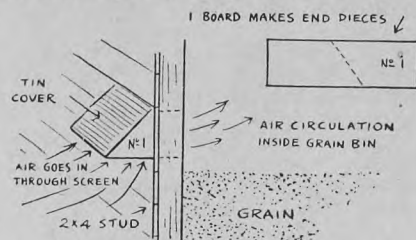
The diagram shows a quick handy way to repair split binder slats in the field so they will give considerable further service. Cut the pieces as shown from heavy gauge sheet steel, bend it around the broken slat as shown, first



turning the sharp points inward a little so in closing they will be forced into the wood slightly. If this repair is made when quitting at night and the broken surfaces first coated with liquid glue, it will be practically as strong as a new slat by morning. —I.W.D.

## Ventilator for Grain Bin

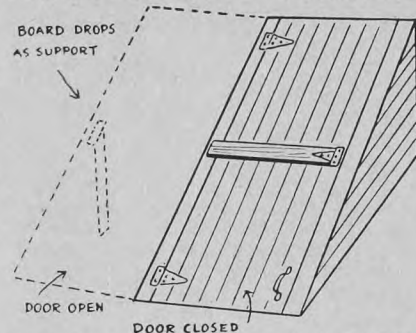
To provide ventilation over the grain in a grain bin without danger of rain or snow getting in take a piece of 1x10 or 1x12 and cut it as shown in No. 1.



This provides both ends of the ventilator. Cut away sufficient siding and nail each piece to a stud. Cover with a piece of tin which runs through the siding and on the bottom tack a piece of screen to keep birds out. A similar opening on the opposite side will provide a direct draft across the top of the grain.

## Prop for Cellar Door

Half way up the door a 1x4 strip is fastened to it at one end with a T-hinge. When the door is opened this



strip acts as a prop. The height at which it is desired to hold the door is gauged by the length of the strip. —Laurence Whatley, Saskatoon.

## Reflector Protects Mail Box



Just so that trucks or passenger cars will not knock your mail box down, it's a bright idea to fasten a bright reflector on the proper side of the box as shown. The little reflectors used on bicycles are good for this purpose.

## Broom From Wide Paint Brush

For getting into small corners I took an old paint brush and wired it to an old broom handle. With it you can



sweep in behind radiators where a broom won't go. I also found it handy for cleaning leaves and trash out from among the shrubs in the hedge. —Geo. Ray.

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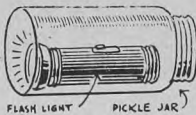
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### Jar Protects Flashlight

Having a sudden, urgent need of a flashlight in a driving rain at night, I first placed the flashlight, with the current on, in an ordinary large mouth pickle jar, then screwed on the lid tight.

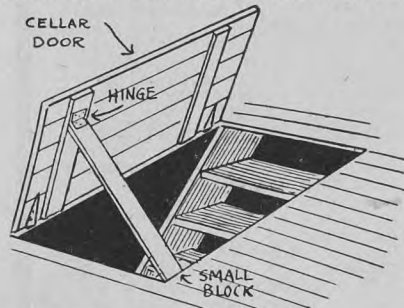
Although more than 30 minutes were spent out in the storm, part of the time the jar being carried and more of the time with it laid down so that both hands could be used to repair a leak in the roof, there was no moisture which reached the mechanism.

The idea is worth remembering also for camping trips when flashlights not wholly weather-proofed are taken along.—Dale Van Horn.



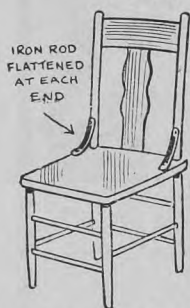
### Prop For Cellar Door

When a cellar door is in the middle of the floor there is nothing to open it up against. This is a useful gadget to make for use in such a case. When the



door is closed the prop hangs down in the cellar out of everybody's way.—Mrs. H. Feather, Grenfell, Sask.

### Braces For Chairs



corners.—Frank Thiesen, R.R. 2, Winkler, Man.

### Tarring a Roof



For tarring a roof which was so small that I did not feel justified in buying a regular brush, I made one which answered the purpose just as well. It consists of an old paint brush, a garden hoe and a small C-clamp. The latter holds the brush securely to the hoe. This improvisation was assembled in a few minutes

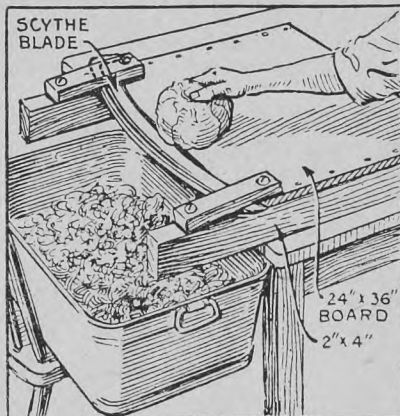
### Don't Fall Off the Roof

Never take any chances of a ladder slipping off a steep roof. Here is a way to avoid all danger of that happening. The ladder is anchored in such a way that it simply cannot slip or give in any way. Before nailing on the pieces see that they are at the same angle as the roof and thus avoid strains. Then you can repair the shingles or apply the shingle stain in perfect safety as far as the ladder is concerned.



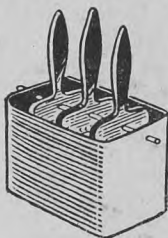
### Homemade Kraut Cutter

The fellow who likes kraut made to order can have it that way by using a cutter constructed from a scythe blade and a few boards. If you will use a



little of your spare time to make up such a cutter, you can be sure of having it ready for use during this fall's "kraut making" time.

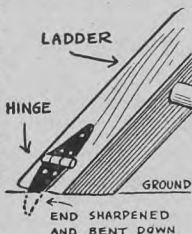
### Care of Paint Brushes



of the brushes. The wire prevents them from touching the bottom of the container.

### Making a Ladder Safer

An old strap hinge fastened to the foot of a ladder will prevent it from slipping on even hard or frozen ground. When not wanted the flaps can be laid back and held with a ring of inner tube. —A. S. Wurz, jr., Rockyford, Alta.



### Ladder on Wheels

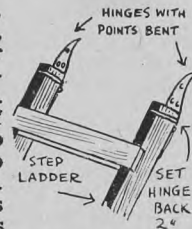
A step ladder is a handy thing to have about the farm and here is one that is mounted on running gear and is that much the handier. For painting, fruit



picking and the like it is highly recommended. Prairie farmers, with no tree fruit to pick, will not need it for that purpose, but The Guide has over 21,000 subscribers in B.C. The only requirements for making the wheeled ladder are the front wheels and axle of an old buggy or car and some lumber. The height can vary according to requirements.

### To Prevent Side Slipping

Two strap hinges, pointed as shown, will keep a ladder from slipping sideways at the top. Place the joints of the hinges two inches below the top of the ladder top. Good stout cords hold the top straps of the hinges straight while the ladder is being placed upright. —A. S. Wurz.



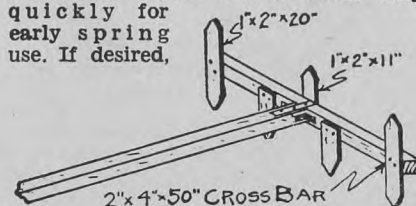
### Repair to Scoop Shovel

If the blade of your scoop shovel cracks you can prevent the crack from enlarging by taking two discarded knife sections and riveting them over the crack, one on each side. —A. C. Embury, Baldur, Man.



### Handy Garden Marker

Here is a device for laying off rows in the garden which can be made very quickly for early spring use. If desired,

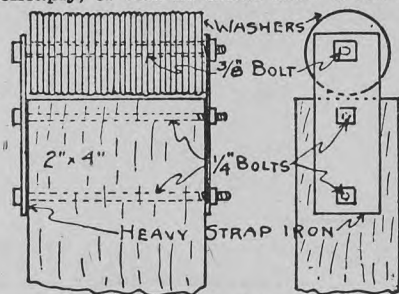


the markers may be made adjustable for width by bolts and a number of holes through the cross-piece.



### Emery Wheel Dresser

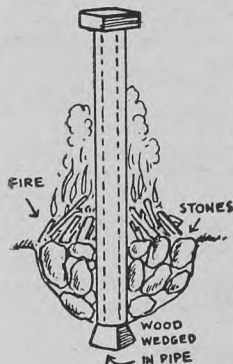
Grinding wheels occasionally should be trued up and the glaze removed by holding a dresser against them while they are turned. These can be bought cheaply, or can be made from a set of



round washers as shown in the diagram. The washers can be hardened considerably by throwing them red hot into water. Fairly good results can be secured by holding the end of a pipe or bar against the wheel while it is turned.

### For Softening Wood

To soften a long piece of wood for

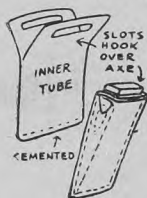


bending get a piece of iron drain pipe and block one end of it with a wooden plug. Then dig a hole about two feet deep and set up the pipe in it, with the closed end downward. Fill around it with stones. Fill the pipe with water, insert the piece of wood to be softened, and build a fire around the pipe as shown. Keep the water boiling until the wood is soft.

### Improved Measuring Tool

A pencil with a sliding clip is just the thing to measure the depth of holes in castings or holes drilled in wood.

### Axe Sheath



To make this axe sheath take a section of inner tube, cement it at the bottom and slit down the two sides at the top. Two slots are made which slip over the top of the axe above the handle. — G.D.D., Winnipeg.

### A Good Battery Carrier

Here's the way to make an efficient battery carrier from a strap-on safety chain: Cut off the ends where the cross chains fasten and drill holes in the remaining metal just large enough to slip down over the battery terminal posts. By using such a carrier you can handle all kinds of storage batteries without any trouble.

# WHEN THE JOB CALLS FOR Wallboard

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Has it the patented end-bundling with quick-opening ripcord?	Yes	?
Is it structurally strong?	Yes	?
Is it made from specially hard deep-mined Gypsum?	Yes	?
Has it insulating value?	Yes	?
Does it come in 12 ft. lengths?	Yes	?
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Will it nail without breaking at corners or edges?	Yes	?
Can joints be made without showing?	Yes	?
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## Repairing Harness

The first thing to learn in mending leather is how to make a wax end. For harness stitching No. 10 linen thread is used. A three-foot length can be taken. Long tapering ends are needed. Untwist the thread by rolling it on the thigh and then tease apart. For heavy work, like tugs, six or seven threads are waxed together. They are assembled, with the end of each succeeding thread slightly beyond the other. Place the assembled threads over a nail in the middle. Place a bit of shoemakers' wax on a piece of leather and put it near the stove so that the wax will melt on the leather. Then draw it over the teased out ends of the threads. The ends of the assembled threads are first waxed. The threads themselves are then twisted and waxed.

A harness makers' awl is used. The spacing can be done with a spacer,



Fig. 1. Leather marker.

which can be purchased at the hardware store or, the idea in fig. 1 can be utilized. It was sent in by Paul Tremblay, St. Paul, Alta.

A gear from an old clock and a clothespin are used. The teeth can be filed to any size needed. A simple harness clamp can be made as shown in fig. 2. The dimensions of A and B are given. C is  $\frac{3}{4}$ -inch square, slightly bevelled. At the bottom is a piece of leather. The clamp is put in an ordinary vise when being used.

When threading the needles, which are placed one at each end of the thread, draw the tapered end through

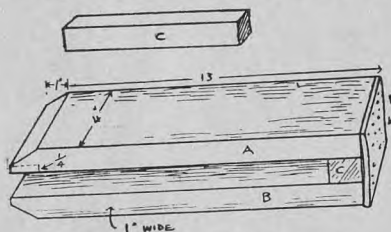


Fig. 2. Simple harness clamp.

the eye two or three inches, bend the thread back and twist between the thumb and finger.

Fig. 3 shows how to cut the ends of a strap for splicing. First cut each end square. The hair, or smooth side is much stronger than the flesh side, therefore

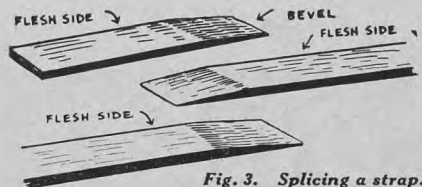


Fig. 3. Splicing a strap.

in beveling always cut away the flesh side as shown in the upper figure in the cut. The lower two pieces are put together as shown, with the straight side of one strap placed in contact with the bevelled side of the other.

Fig. 4 shows how the stitching is done, with the two ends of strap held in place by the clamp.

After marking, with a spacer or a ruler, the holes are punched with the awl, puncturing from the smooth side toward the flesh side. The stitching is done by passing both needles through the holes from opposite sides and drawing each stitch very tightly. When the last stitch through both straps is made cross over as shown, whichever method is preferred, then reverse the splice in the clamp, with the smooth side still to the right, and stitch the other edge of the splice. To finish the stitching, place the left needle and thread through as usual; then place the right needle in the hole and wind the left thread twice around the right needle and draw both ends tight. The winding will lock the threads in the leather. Make another small hole one-eighth inch below the next to the last one on the splice and put in another locking twist. Then cut off both threads. The finish is shown in fig. 5.

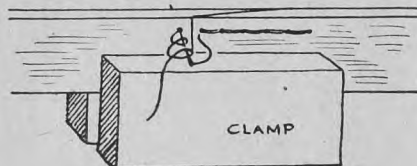


Fig. 5. Locking the threads.

To attach a buckle to a strap by riveting first cut the corners off from the end of the strap. Then mark the first hole between  $2\frac{1}{2}$  and 3 inches from the end of the strap. The other one is an inch further. Punch the holes and make the slot. Bevel the end for  $\frac{3}{4}$ -inch on the flesh side. Also bevel another piece at both ends for the insert. Place buckle and loop in position and rivet as shown. If a slide loop is used the strap should extend back three or four inches from the buckle.

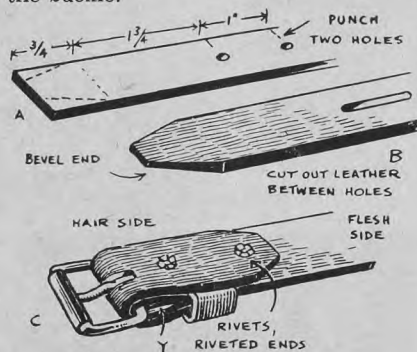


Fig. 6. Riveting buckle to strap.

In mending a broken tug a plain stitched splice will do, even when the break is at a buckle hole as it generally is. The tug is shortened the length of the splice. First square the broken ends

then bevel each back six or eight inches. The stitches holding the straps together are then cut for some distance so that when the bevelled trace ends are put together the straps from one end of the tug can be placed between the straps from the other end of the trace. Place the trace in a clamp and stitch.

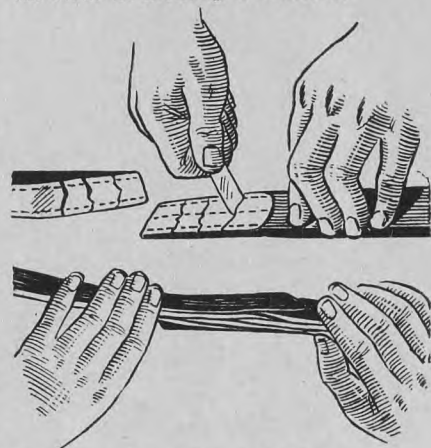


Fig. 7. Splicing a tug.

A simple way to splice a tug is to use a metal tug splicer. The broken ends are squared. Then lay the ends together place the splicer on top and mark the rivet holes. Punch the holes, insert the splicer and then the rivets, being sure that the heads of the rivets are next to the horse.

Note: — Most of the material in this article is from the Cornell bulletin, Repairing Harness.

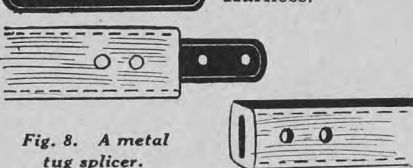
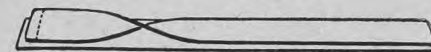


Fig. 8. A metal tug splicer.

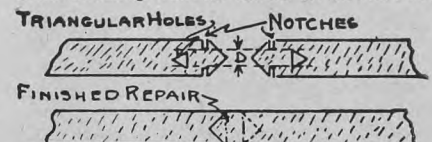
## Butting Belt Ends



Be sure that the ends are cut at a right angle. If no square is handy, employ the method shown in the drawing. Double your belt, then twist one end so that it is reversed, and cut both ends at the same time.

## Quick Repair for Broken Strap

A satisfactory emergency repair for a broken strap can be made as shown. Of



MAKE D'  $\frac{1}{3}$  TO  $\frac{1}{2}$  WIDTH OF STRAP

course it should be sewed or riveted at the first opportunity—I. W. Dickerson.



## Repairing Hay Ropes

When a rope breaks, and you have two ropes instead of one, it is well to know how to put them together again, end to end. You lengthen the life of the rope, and new rope isn't easy to get. But first

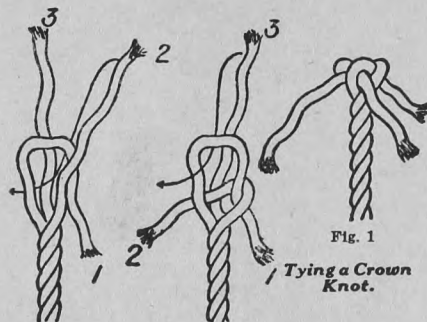


Fig. 1

Tying a Crown Knot.

let us learn how to make a knot on the end of the rope. The following instructions are from an Iowa bulletin on knots and splices.

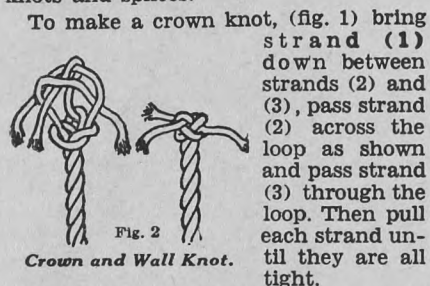


Fig. 2

Crown and Wall Knot.

The crown knot can be made more secure by adding the wall knot as shown here (fig. 2).

### The Short Splice

If there is a straight pull and the rope doesn't have to pass through a pulley, a short splice will do. The steps in making this splice are shown in (figs. 3, 4, 5 and 6). The two ends are unwound and then locked together so that those from one end pass alternately between those from the other end. Taking two strands from opposite sides, (a) and (1), (fig. 3) tie a simple knot (fig. 4). Repeat with (b) and (2) and with (c) and (3). Draw the knots tightly, then passing each strand of the rope diagonally to the left, tuck the ends under the strands of rope (y). Then turn the rope end for end and repeat by splicing down the strands of rope (y) (fig. 5). When the splice is completed each strand from both ropes should be spliced under at least two places, depending on the size of the rope and the strain it has to carry. The splice can be made, of course, without

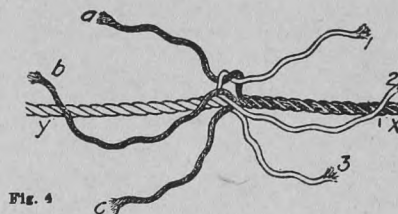


Fig. 4

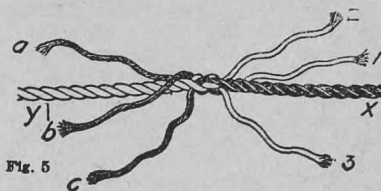


Fig. 5



Fig. 6

Steps in making a Short Splice.

beginning with the overhand knots. The finished splice is shown in (fig. 6).

### The Long Splice

For a long splice, a  $\frac{3}{8}$ -inch rope will require a free end of about 18 inches and an inch rope, of 36 inches. The strands are locked together as when beginning a short splice, making sure that the strands are properly paired. The strands of two pairs, as (b) and (2) and (c) and (3) (fig. 7), are then tied together, leaving (a) and (1) free. Unlay strand (a) one turn and follow it by relaying strand (1) in its place, drawing it firmly and keeping it twisted tightly. Continue until 6 or 8 inches from the end of the relaid strand (1) and tie as in (fig. 11).

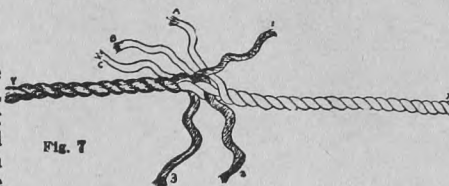


Fig. 7

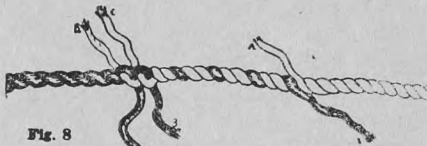


Fig. 8

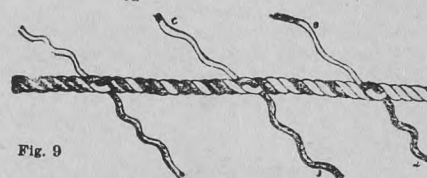


Fig. 9

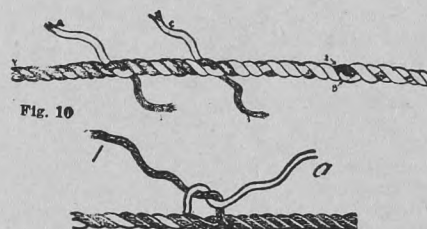


Fig. 10

Fig. 11

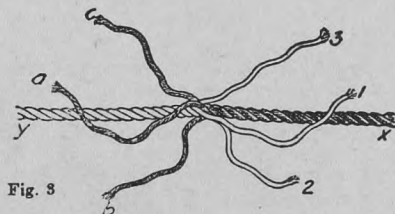


Fig. 3



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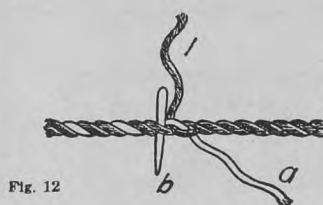


Fig. 12



Fig. 13



Fig. 14

Steps in making a Long Splice.

Then turn the rope end for end and unfasten (b) and (2) (fig. 8). Repeat as with the first pair and tie. The rope will

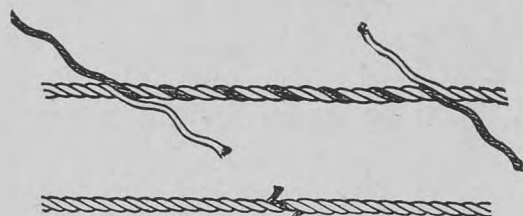
now appear as in (fig. 9), the ties should be separated the same distance and each strand coming from (x) should be placed in front of the strand from (y) and tied. Crossing the strands otherwise, as behind (1), a mistake often made, makes it impossible to complete the splice properly.

The splice is completed as follows: With the ends properly tied, (fig. 11) with the right hand overhand knot, draw down firmly into the rope (fig. 12). The end (1) is now spliced down by being passed over the first strand (a) and under the second (b) as shown by the marine spike (fig. 12), then over the third (c) and under the fourth (a) (fig. 13). Draw down end (1) and cut it off, leaving it  $\frac{1}{4}$ -inch long (fig. 14). In identically the same manner splice down and cut off each of the remaining strands. The splice is finished by pounding down the uneven parts and rolling it on the floor under the foot. The finished long splice appears as in (fig. 15).



Fig. 15. The Long Splice as it appears when completed.

### Mending a Broken Strand

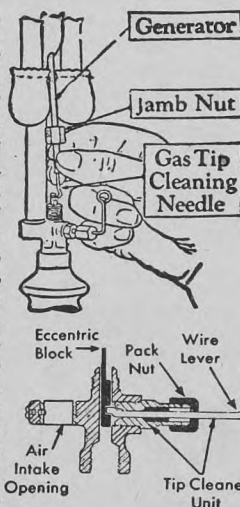


When it is necessary to mend a broken strand of rope, or replace a piece of strand that is badly worn or frayed, unlay the strand back both ways, procure a new strand of sufficient length and relay it. The directions for doing this are the same as those given for making a long splice.

### Reconditioning Coleman Lamp

When the mantle of a Coleman lamp turns black, it is due to a lack of air. The remedy is to clean the parts, including the air intake tube, mixing chamber, burner tubes and caps. Replace any parts that are burnt out or corroded. A bent or warped generator should be straightened. It must be straight in line with the air intake tube.

Be sure that the gas tip cleaning needle is working. Carbon tends to form on the small aperture through which the vaporized gasoline passes into the air intake, where it is mixed with air. A very thin wire attached to an eccentric at the



lower end, with a cat's whisker at the upper end, is built into the lamp. If the generator is plugged it may be because the cleaning needle is out of repair. It should be replaced so that the aperture will be kept clear.

The fountain should be kept very clean at all times. Rinse it out thoroughly with gasoline. If there is a loss of pressure due to a leak, locate the leak by holding the fountain under water, and then repair it.

A booklet on reconditioning and repairing Coleman products has been issued and can be obtained for the asking from your local dealer or from The Coleman Lamp and Stove Company, 9 Davis Street, Toronto.

### Toggle for Kettle Lid

The knobs are forever coming off kettle lids, generally due to rust on the screws and nuts. A good plan is to take out the old screw and nut and put an ordinary screw into the knob from beneath. Mine has served for about a year now with no sign of coming off.—Geo. Ray.



### Another Door Catch

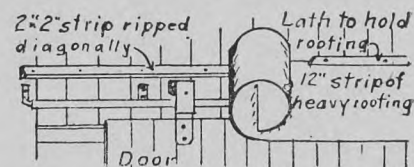
Seeing a door catch described in your Fall Work in the Workshop, I am enclosing a sketch of one I have used for quite a few years. It has an advantage over some door catches because it is used half way up the door and never becomes clogged with snow or ice. A bit of light spring, a short piece of strap iron and two quarter-inch bolts are all that are necessary to make it. The



door is caught automatically when the door is pushed open wide and a slight pull back on the strap iron releases it. The catch will last as long as the building.—John R. Anderson, Rocanville, Sask.

### Protecting Barn Door Track

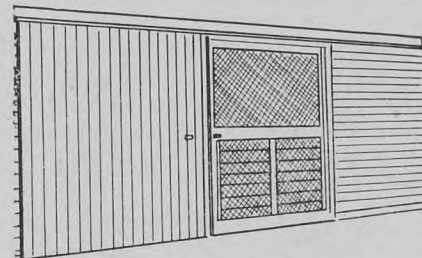
Sliding barn doors are usually hung on the outside, and we had much trouble with water running down the outside



of the gable end and inside of the door, making the floor very wet in a hard driving rain. Snow also blew in badly and sleet and ice bothered in freezing weather. The diagram shows how we stopped the trouble by cutting a strip of heavy roll roofing 12 inches wide and putting it over the track and top of door. We ripped a 2x2 on the diagonal and used it under the strip at the top to throw it away from the wall and lessen the rubbing of the hangers. The top was fastened with laths so it could be removed easily.—I.W.D.

### All Weather Doors for Barn

By extending the door track as far one side of the doorway as the other, the owner of this barn is thus able to use two doors. One is conventional, tight, and when used, completely closes

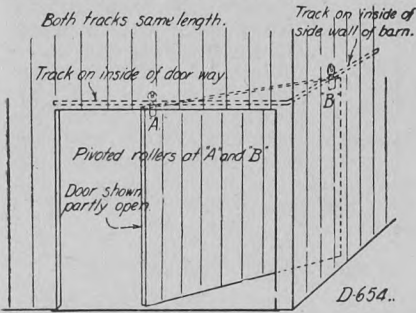


the barn. The other is merely a frame the size of the first door, but carrying a panel gate over the lower half while the upper half is covered with taut woven wire. This door keeps stock in or out, yet ensures ample ventilation on hot days.—Dale Van Horn.



### Inside Rolling Door

Under some conditions this kind of a barn door can be used to advantage.

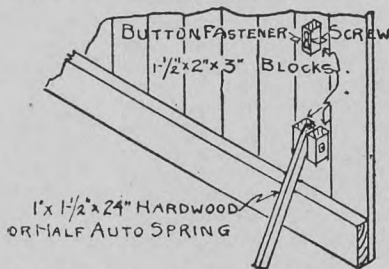


### Barn Door That Won't Blow Down—

The tracks are on the inside and both are of the same length. The pulleys have to be pivoted and must be close to the edges of the door. One advantage of inside doors is that they are not blocked by snow or manure.—I.W.D.

### Barn or Garage Door Stop

Nothing is more annoying than to have the wind slam a barn or garage door just when you don't want it to shut. Here is a simple but effective stop



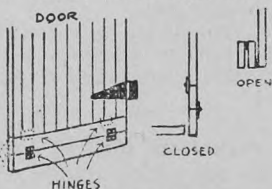
which is always at hand and will hold the door where you want it. Half an auto or buggy spring is fine for the prop.

### Garage or Barn Door Stop

A piece of flat iron 16 inches long with a hole bored five inches from the one end and fitted into a stake will hold any door on hinges. The stake must be driven into the ground far enough so that the door will pass over it.—A. T. Glosser, Hepburn, Sask.

### Prevents Door from Binding

Heavy swinging doors, such as garage or barn doors, often bind at the bot-

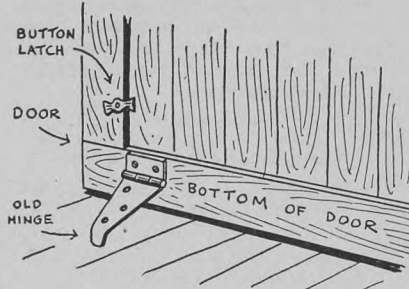


tom in winter time on the ice or packed snow. The nuisance can be easily avoided by attaching this double hinged section on the bottom. Whether the door is being opened or closed one of

the sets of hinges opens and prevents binding. The same idea could be adapted to a gate to make it easier to open and shut when the snow is deep.—Martin S. Walder, Raley, Alta.

### Garage or Stable Door Stop

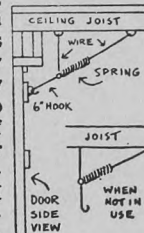
A door stop can be quickly and easily made from an old T-hinge. It is screwed to the bottom of the door and bent a



little at the other end to make it grip the floor. A small button latch is fastened above the hinge to hold it up when the door is closed.—Paul Tremblay, St. Paul, Alta.

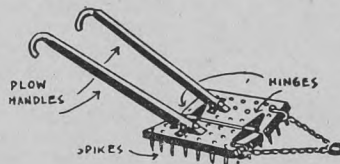
### Barn Door Closer

In barns having double doors closing in the centre trouble is sometimes caused by harness catching, or by two animals trying to go out through one half of the door while the other half is hooked. To overcome the difficulty I fixed up this arrangement. I took a wagon seat coil spring and fastened a six-inch hook to one end of it. This hooks into a staple in the door near the top. The other end of the spring is fastened to a joist by means of a wire. Another piece of wire keeps it from falling down when not in use. This automatically closes the door when it is pulled open by an animal pushing against it.—M.H.S., Calder, Sask.



### A Harrow For a Dollar

This little harrow costs but little and can be used for cultivating between the rows of garden stuff or potatoes. It could be so constructed as to straddle the rows when the stuff is small by raising the hinges with blocks. Use



four-inch spikes as they are much heavier than the 3 1/2-inch spikes generally used around the farm. Old plow or cultivator handles can be used, but if none are available they can easily be shaped out of some 2x2 stuff. The little affair will save a lot of hoeing.

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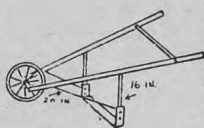
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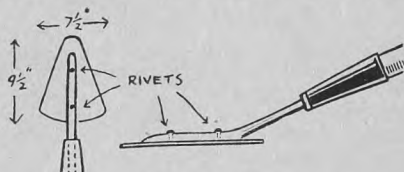
## A Wheel Hoe



The knife of this cultivator was made from an old car spring, shaped and tempered by a blacksmith. The handles were made from 2x2 banister stock. The braces are ordinary band iron. When laying out the garden have the rows of vegetables a little wider than the cultivator blade so that you have to go down the row only once for each cultivation.—A. T. Gossen, Hepburn, Sask.

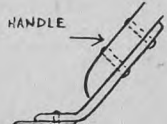
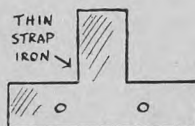
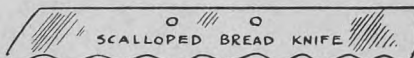
## Home-made Push Hoe

Following the lead of a Manitoba orchardist, I have designed and tried out half a dozen push hoes of various angles, shapes and sizes. The one I like best, and intend to use henceforth, is light and not too wide, quite pointed, and with strongly sloping sides, though blunt on the very tip. The long slope gives one a chance to cut through even stout weeds with little force, and the blunted end enables one to hit square-



on upon a particularly stubborn plant. The metal from the feeder knives of a grain separator makes very good material for a push hoe. No trouble should be spared to obtain a good, smooth handle, and its angle with the blade should be that best suited to the man who uses it oftenest.—Percy H. Wright, Moose Range, Sask.

## Garden Time Saver



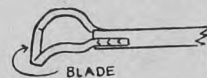
A very convenient device for hoeing between garden plants is made from an old scalloped bread knife. It eliminates hand weeding which is very tedious. Drilling holes in the blade about three or four inches apart. Take a piece of thin strap iron and make two holes to correspond with those in the blade. Note the angle of the strap iron in diagram. The bread knife blade is now attached to a handle about four inches long. This hoe is used by moving it back and forth, just as though cutting bread, as you move along the rows.—A.P., Dallas, Man.

## New Use for Old Hoe

An ordinary garden hoe which is worn out and will not work well any more can be made into a handy hand cultivator by chiselling it into the shape indicated by the dotted lines. When the young plants are just above the ground a person can hoe them on both sides of the row and stir up the soil around and between them.—Bernard Schick, Carmel, Sask.



## Improvised Garden Hoe



This is a home-made garden tool which I have proved myself to be very handy and useful, at the same time being cheap and easy to make. Take a piece of strap iron and bend it in the manner shown. Then fasten it to the handle. Sharpen the blade on both sides and work the hoe backward and forward. A big patch can be hoed in a short time.—Henry A. Jantz, Langham, Sask.

## Briar Cutter

To make a briar cutter get a worn-out mower blade and cut off a length that has four sections or teeth. Rivet this to the eye of a scuffler hoe, or weld it to the blade of an old grubbing hoe. Sharpen the knives with a file or emery and you have a good tool to cut briars as well as an excellent fire-fighting tool.



## Rake from Fork

Needing a rake about the workshop I got an old fork with five tines, heated the tines and bent them over in a curve so that all the points were in line. Then I found that the rake was also useful in cleaning up the yard or cleaning stables.



## Brush Hook from Shovel

An old shovel of the round nosed type can be made into a useful brush hook for clearing land along fence rows and similar work. The blade is cut away as shown by the dotted lines and the resulting sickle is sharpened. It makes a useful tool.



## Brush Axe from Rolling Coulter

Take an old rolling coulter from a gang plow, heat it and halve it. Next drill two holes as shown in the illustration. From two pieces of 1 1/4-inch iron make two loops for the handle. Make the handle, bowed as shown, and saw a slot in it for the straight end edge of the



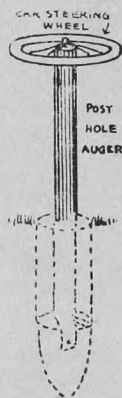
blade to get greater firmness. Then rivet the loops on as shown. The cutting edge of this axe, being wide and thin, cuts



many kinds of brush or even small trees much better than an ordinary axe. Two or three may be cut off with a single stroke. I have used this axe myself, and a neighbor cut nearly 200 acres of brush with it. — Theodore Troitsky, Springdale, Alta.

### Steering Wheel Auger

A car steering wheel placed on the common post hole digger will greatly improve it, especially when it is necessary to make a post hole near another post, as the ordinary type of handle has a tendency to get caught and often results in the injury of the operator's hands. The drawing is quite self explanatory. If the hole in the steering wheel is too big a bushing will remedy this.

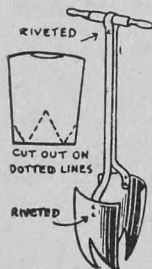


### Shovel from Ford Fender

That perpetual rattle from a Model T fender can be converted into a sturdy fire shovel. I think the illustration is sufficient without any instructions how to make it. — Wm. Kowalchuk.



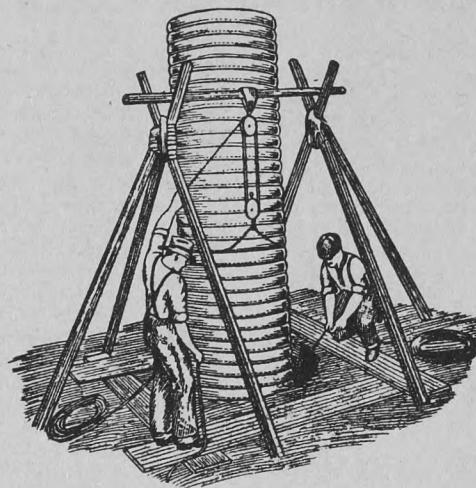
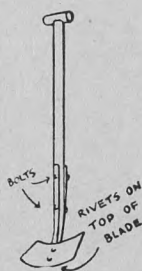
### Auger from Two Shovels



A post hole auger can be made from two old shovels. The shovel blades are cut as shown and riveted to the ends of a piece of stout flat iron rod. This works all right in clay or soil that is not full of stones. — John H. Schab, Winnipeg, Man.

### A Push Hoe

A piece cut from a gas barrel top, two pieces of heavy strap iron and the stem of a small spruce tree or other piece of wood are all that are necessary to make this handy push hoe. A push hoe is an excellent implement in keeping the garden clean. — C. Leder, Neerlandia, Alta.



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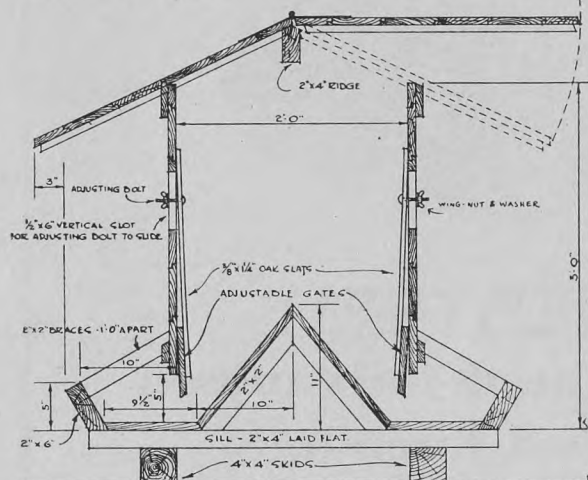
VANCOUVER

## SECTION 9.

## Concerning Livestock

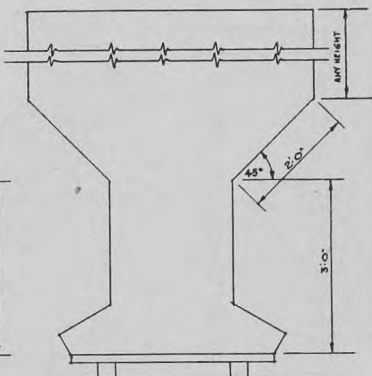
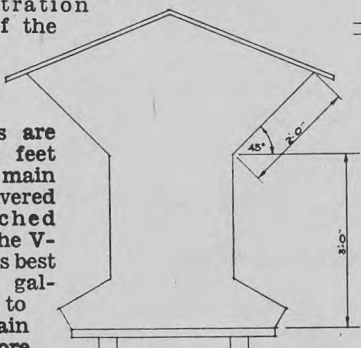
## Field Self-feeder for Hogs

When 10 or more pigs are kept the labor-saving feature of a self-feeder merits attention, says the Alberta department of agriculture in explaining this easily constructed self-feeder for hogs. It saves 60 per cent of the labor, reduces waste and gives the weaker pigs a chance, though it is best to keep hogs



of the same size together. Trough space is saved and since grain is before the hogs all the time, digestive trouble from overloading the stomach is reduced.

The illustration gives most of the construction details. The skids are 10 feet long and the sills are placed three feet apart. The main floor is covered with matched lumber and the V-shaped part is best covered with galvanized iron to make the grain slide down more readily. The 2x2 braces are a foot apart and are let into the front side of the



recder will hold approximately three-quarters of a triple wagon-box load of ground grain. For inside use

the extension shown on the right can be carried to any convenient height.

### Calf Weaner

From an old car, we got a sheet of strong sheet metal from which we cut a strip nine inches by ten inches. The strip was bent to fit the calf's muzzle. Holes were punched in the tin, with the jagged ends outward, to help the calf breathe and to make it uncomfortable for the mother when it tries to suck. The weaner extends about two inches past the calf's mouth. It is best suited to big, strong calves. This is simply a new use for the old Model T.—Wilfred Brewer, Ashville, Man.



trough. For outside use lids can be hinged over the trough to keep out the rain and prevent the dry feed from blowing. Hogs soon learn to lift the lids. A separate lid is made for each one-foot section.

Sides, ends and roof are covered with shiplap and the roof covered with ready roofing. A canvas strip nailed over the ridge prevents rain from entering. The overhang of the roof is to prevent rain from dripping into the trough.

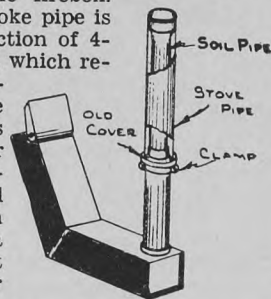
A feature of the trough is the adjustable slide. It consists of a 6-inch board, held by flexible wooden slats  $\frac{3}{4}$ "x1½"x28". They are nailed firmly to the slide board as shown. The slots at the top are in the wall of the feeder and provide for the adjustment of the slide board. A feeder six feet long will accommodate 24 pigs.

The lower cuts show how the feed capacity of the self-feeder can be increased. With the extension shown on the left a six-foot feeder will hold approximately a triple wagon-ground grain. For inside use

## Better Tank Heater Pipe

With this device an air jacket around the pipe does away with water condensing on the inside and dripping down into the firebox.

The inner smoke pipe is a five-foot section of 4-inch soil pipe, which replaces the original smoke stack and fits closely over the lower section. An old cream can cover has a hole cut in it to slip over the lower

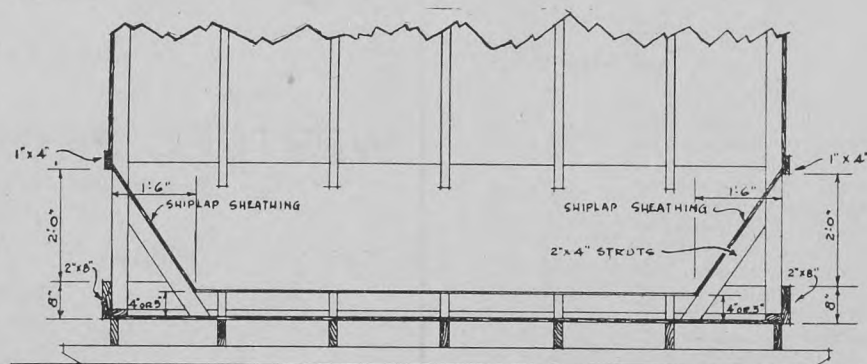


smoke pipe, while a clamp made of heavy strap iron fits around the lower pipe to hold the upper pipe at any desired height by means of bolts through the ends of the collar. Six-inch stove pipe is slipped down outside the soil pipe so as to make practically air-tight and water-tight joints both at the top and bottom. This will need careful fitting, but should last for years.—I.W.D.

## Grain Self-feeder for Cattle

An A-1 self-feeder for cattle can be converted from an old granary, according to this plan, also by the Alberta department of agriculture. The building is blocked up 20 to 24 inches above the ground. Leave the first 8-inch board on the bottom of two sides and an end and remove the next three boards above it. This leaves an opening two feet deep.

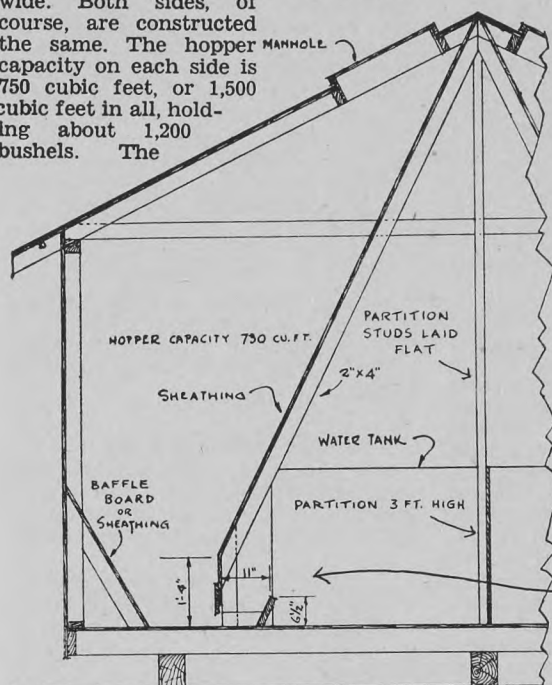
Next construct baffle boards on two sides and one end of the interior, as shown in this cross-section view. Frame in the struts of 2x4 stuff, one at each stud. It would be safer to have the bottom of the strut come directly above the joist as there is considerable weight on the baffle board. Cover the struts with shiplap as shown and the job is done. The illustration shows the framing and gives an interior view of the back end. Do not be confused about the bottom of the baffleboard at the back. It might be mistaken in the cut for a false floor. There is an opening 4 or 5 inches deep at the bottom of the baffleboard to allow the grain ration to flow within reach of the cattle.



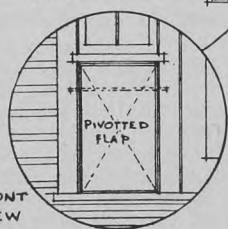
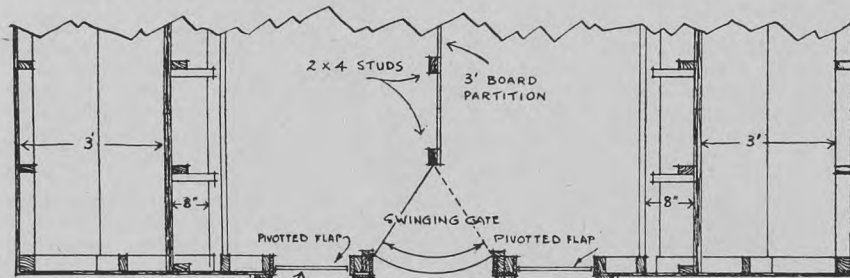
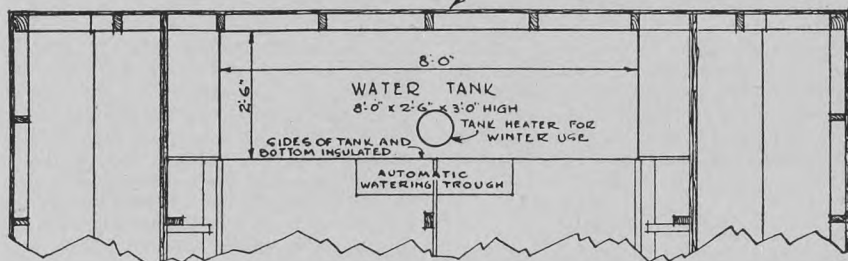


## Combination Inside Self-feeder

This is a design of a combination inside self-feeder for hogs. The top illustration shows one-half of a cross-section of the building, which is 16 feet wide. Both sides, of course, are constructed the same. The hopper capacity on each side is 750 cubic feet, or 1,500 cubic feet in all, holding about 1,200 bushels. The



NOTE: TWO SMALL SASH MAY BE SET IN THIS WALL ABOVE WATER TANK

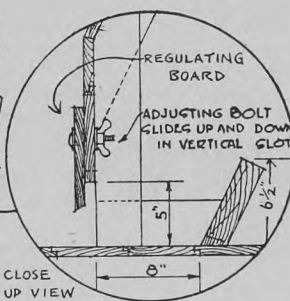


FRONT VIEW

Also the detailed drawing at the right,

showing how the regulating board is adjusted. There is a row of studs down the centre, which is boarded up three feet to form a partition. The measurements for the different parts are given.

The lower illustration shows the ground floor. Note that the troughs are along the sides. At one end is a water tank, with a tank heater for winter use. An automatic cut-off keeps the water trough from overflowing. At the other end is the main door in the middle, swinging outward. On each side of it is a pivoted flap which automatically closes, but which the pigs soon learn



to open. It swings freely both ways. A swinging gate gives access by the attendant to each side of the pen when cleaning it out, etc.

Light is admitted by two windows, one over each pivoted flap, and another sash in the upper part of the main door. Two small sash can be fitted between the studs at the other end for additional light. The feeding troughs are 14 feet long in an 18-foot building.



You Can Open the Stanchion with One Hand

## Easy to Tie or Untie with *Beatty* STANCHIONS

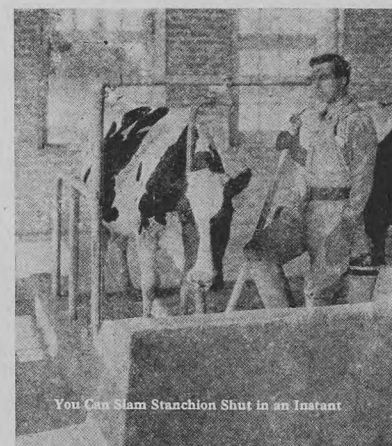
With Beatty Stanchions you don't go up between the cows to tie or untie them, you simply walk down the passage in front of the cows. You can tie six or untie four while you are handling one with cow chains.

In case of fire the saving of a whole herd has been due to ease with which they were set free from Beatty Stanchions.

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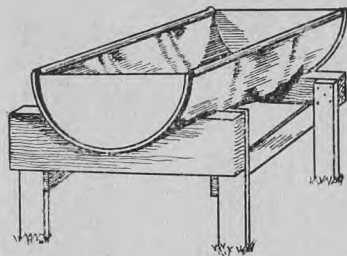
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You Can Slam Stanchion Shut in an Instant

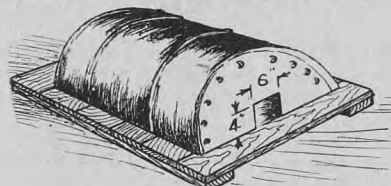
## Half Barrel Trough and Coop

An old metal oil barrel cut in halves lengthwise will be useful to make two feed or water troughs. The barrel is best cut with an acetylene torch. The sharp edges can be shielded with pieces of split



metal pipe and fastened by spot welding in a few places sufficient to hold the pipe. A wooden stand can be made with 2x4-inch lumber for legs and braces and 2x10-inch plank for the sides. The sides are then shaped to fit the barrel which completes the job.

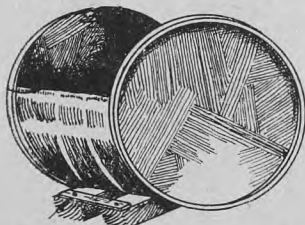
If only one trough is required, the other half can be used to make a durable and weatherproof chick coop. Entrance for the chicks can be made in one end. A canvas curtain fastened over the opening will provide further protection for the chicks. A few small holes drilled in the end will supply additional ventilation. The chick coop may be set on a low wooden platform to provide a dry floor which can also be easily kept clean.



tection for the chicks. A few small holes drilled in the end will supply additional ventilation. The chick coop may be set on a low wooden platform to provide a dry floor which can also be easily kept clean.

## Roll Over Water Trough

During the winter water troughs need to be emptied to prevent accumulation of ice. A roll over water trough made from an old steel barrel can be easily emptied by simply rolling it over on its end rims. Part of the barrel can be cut away with an acetylene torch leaving the top and bottom ends intact. The rough

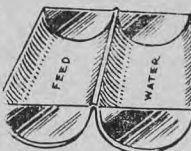


edges of the metal trough can be rolled over or covered with split metal pipe spot-welded or brazed on at a few places. Two 4x6-inch blocks of wood are shaped as bolsters to fit the barrel. These are spaced and held in place with a piece of 2x1/4-inch flat iron bolted to both ends of each block as shown. The roll

over trough is then set on the shaped blocks.

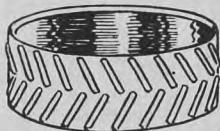
## Double Trough

A discarded hot water tank can be made into a serviceable feed and water trough by having it split, except for one side, and then opened out. A prairie farmer in Alberta sent in the photograph of the trough from which this drawing was made. He claims that it will stand a lot of hard usage and is easy to keep clean.



## Watering Tank from Tractor Wheel

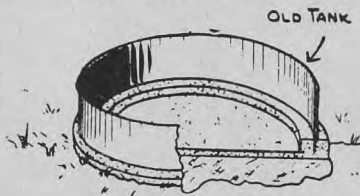
This tank has to be permanently placed. The wheel is a large drive wheel from an old fashioned tractor. The hub and spokes are first removed and then it is laid on its side on a strong re-inforced foundation of concrete. Then a rich mixture of concrete is made and placed on the floor, both inside and outside the wheel,



to make it water tight. If there are any leakages in the rim the cement may be brought up inside it almost to the top. To get a good shape for this lining a template should be made. It is fastened in the centre at the bottom, with the upper part resting on the upper edge of the rim. Then the template can be turned round and round to shape the concrete lining. This trough was first described by Popular Mechanics, from suggestions made by an Iowa farmer.

## Uses Old Tank

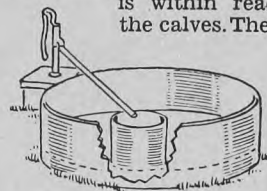
Do not throw away your old galvanized water tanks when the bottom or the lower part of the sidewalls rust away, as they will give much extra service when treated as shown. Dig a trench deep enough to come above all holes and about 12 inches wide. Cut the bottom out of the tank and set the rest of it in the



middle of the trench on the level. Give the joint between tank and concrete a coat of roofing cement both inside and out. Fill in the trench inside and out with rather thin concrete above all holes, and then run in at least a two-inch concrete bottom reinforced both ways with old wire. If properly made, it will last several years at very low cost.

## Water Trough for Calves

This idea came from Kansas and was published in Successful Farming but it will work equally well here. The farmer cut down an oil drum until it was slightly lower than the edge of the watering trough. The water pipe from the pump runs to it and the tendency is for it to keep full, so that the water is within reach of the calves. The over-



flow from the drum supplies the tank. It is necessary to weight the drum down so that it will not be shoved around by the cattle when they come to drink.

## To Save the Birds

Many song birds are drowned every year while trying to get a drink at stock watering troughs on account of the rise and fall of the water. They try to reach



the water while standing on the edge of the trough and, when the water is low, sometimes overbalance and fall in. In addition every bird lover wants to see the birds get all the water they want. It is easily accomplished by anchoring a bit of plank with a string long enough to allow it to rise and fall with the water. The bird can always sit conveniently on the plank and reach the water.—A. S. Wurz, Rockyford, Alta.

## Keeping Ice Out of Trough

Here is our plan to save chopping ice out of a watering trough. Lay one end on the well cover or other support so it is about an inch higher than the other end. Then bore a small hole through the lower end and provide a plug to close the hole. In very cold weather, remove the plug and drain out the water into a pipe or tile as soon as the stock are through drinking, corking the hole again when it is needed the next time.

## Keeping Water Tanks Ice Free

If you have a tank for watering stock get enough cardboard from old boxes to put around the outside of the tank, opening them up and breaking joints with another layer; or a newspaper will do for breaking the joints. With a top made out of two-inch lumber preferably, so that it will not sag, the water will be kept warm at all times. Two or three strands of soft wire will keep the cardboard in place. I have found the round tanks better to keep the water warm

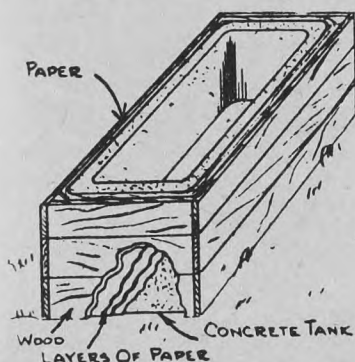


than the long ones as the ends freeze a lot quicker.

Another idea. When once the fire in the tank heater is going good, if you cover the air vent till the wood is about two-thirds burnt you can put a burnt stick into the water till the fire is out and then knock off the charcoal. You can have all the charcoal you need for the chickens and pigs by doing this.

### Board-Paper Tank Insulation

The diagram shows one method of insulating an outside concrete water tank from freezing. Instead of banking it up a couple of feet thick all around, put one or more layers of heavy waterproof roofing paper on the outside of the concrete, then build a wooden box on the outside of the layers of paper. The boards can be nailed to each other as shown at the corners, or better, a 2x4



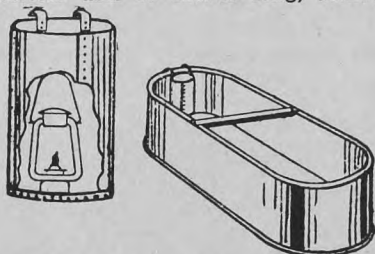
placed at each corner and the boards nailed to it, as the air space helps give insulating value.

The tank heater is placed near the middle of the tank with the pipe coming up through a sheet iron cover to avoid danger of fire. The top lids at each end are covered similar to the sides, one end being hinged to lift up so the stock can drink. This also keeps the water cooler in summer and will last for years.

### Lantern to Heat Stock Water

Here is a very convenient and satisfactory way for keeping ice out of a tank in a barn where cattle or sheep are run during the winter.

The small tank helps to keep the temperature of the water higher. Also bank the tank with six or eight inches of manure and have a cover to drop over the tank during extremely cold weather. Take an old can about eight inches in diameter and 18 inches long, remove

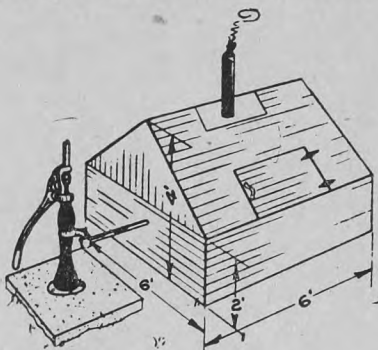


one end, and have hooks attached to the open end so it will hang inside the

water tank. It is necessary to weight this open tank down. A lighted lantern set in this open tank will help keep ice from forming on the water, with the help of the cover in very cold weather, but provision would have to be made for the fumes to escape. A lantern will burn from 24 to 36 hours, so the cost isn't much.—I.W.D.

### Water Tank Cover

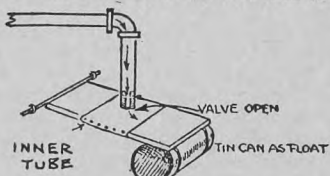
A small shack of old lumber can be built over and around a tank to hold in



the heat from the tank heater. There are two openings for the stock to drink from, one on each side of the roof, as the tank is half in one lot and half in another, with covers which can be laid back on the roof during the mild part of the day. There will be no trouble with ice in the tank, and it is light enough so two men can lift it off in the spring and put it back in the fall.—I.W.D.

### Simple Control Valve

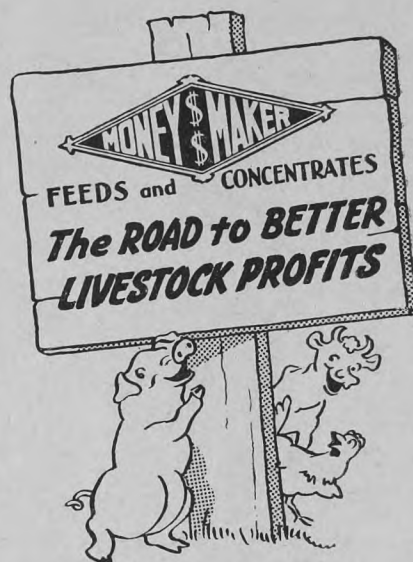
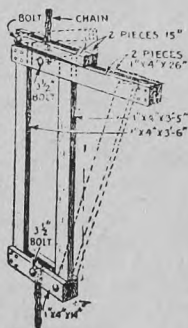
This is a simple way to make a valve to control the flow of water from a tank to a trough. It brings in another use for the well-known inner tube. A bit of



board is hinged as shown. To it is attached an empty tin can of say a gallon capacity. This presses the rubber against the end of the pipe and shuts off the water when the trough is full.

### Cow Stanchion

A few pieces of oak or other strong hardwood, two pieces of chain, a couple of bolts and some nails are all you need to make this cow stanchion. It is swung on the chains and is best fastened permanently at both top and bottom. It will hold any cow and last a long time. The measurements are given in the diagram.



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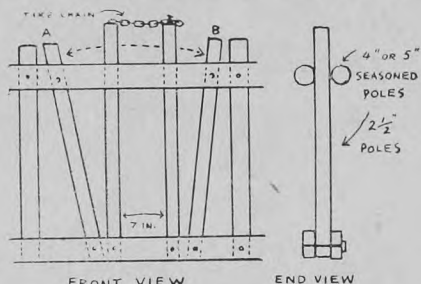


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## Another Cow Stanchion

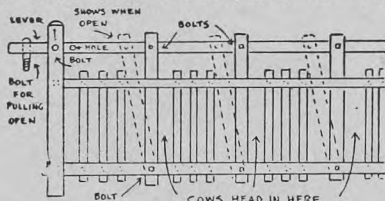
Here is a cow stanchion which costs practically nothing to make, holds the animal securely and allows the cow a certain amount of movement sideways, allowing greater comfort. The stanchion poles are spiked with six-inch spikes in a channel formed by 2x4's at the bottom. The spike serves as a pivot. The



tops of the stanchion poles swing free from A to B in a channel formed by 5-inch poles, removing the objection commonly made to the ordinary home-made stanchion, as the cow has plenty of room to move her head and shoulders from one side to the other. Between each stanchion three pieces of pole are spiked upright to hold the feed back. The distance between the centres of stanchions is 33 inches and between the poles at bottom, inside faces, seven inches, while 50 inches from the floor to above the animal give ample standing room. About seven links of old tie chain make the stanchion immediately adjustable to any size of animal. I stapled the chain on one pole and used a three-inch nail bent at a 45 degrees angle to fasten.—Frank M. Pherrill, Sawdy, Alta.

## Cattle Stanchion

I have seen all kinds of cattle stanchions, but none of them was as simple nor worked so well as the one shown here. One lever opens and closes them for all the cattle in the row. A long bolt or pin is placed in the lever to pull it out and push it in again. A hole is made through the post and lever and a bolt slipped in to hold the lever shut when the cows' heads are in place. The lever



is made of 2x6 and is supported by posts to keep the cows from breaking it.—J. E. Tracht, Lethbridge, Alta.

## Keeps Cows from Switching

This is how I keep my cows from switching their tails while being milked. I took several spring-type storage battery clips. The large sized ones are the best. Then I put several halter rings on a heavy wire and stretched it behind and

above the cows. The battery clips are fastened to the rings with heavy cord so that they come about level with the cows' back. When milking a cow we just slip the clips on the end of the cow's tail. The tension is enough to hold them and as they are on the wire they can easily be slid from one cow to the next. You need one for each milker.—C.W.R., Alberta.

## For A Non-stop Switcher

An old battery clip, a piece of halter chain or small rope and a block of wood are the main features of this cow tail holder. The chain is attached to the block with a staple and the clip, a large one, is snapped to a bunch of hair on the cows tail before beginning to milk. Paul Tremblay, St. Paul, Alta.



## Taming a Cow's Tail



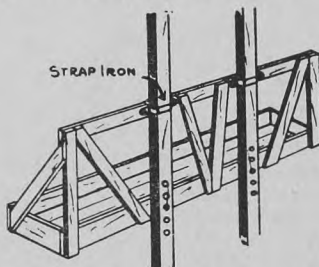
Herbert Ratzlaff, Waldhiem, Sask.

The unpleasantness of being wallowed about the head and face by a cow's tail while milking is in progress may be easily averted by throwing a loop of heavy rope over the cow's hips and tail as shown in the illustration. —

## Adjustable Manger

When snow, hay and manure pile up, this manger may be raised to prevent cattle from getting into it. It may also be used inside a building where the posts may be a part of the barn framing. Outside the posts may be set permanently in the ground, or if preferred, be part of a movable frame.

The feed bunk itself consists of two main parts—the feed trough built of 2x12-inch planks; and the rack part of a 2x8 top piece and a 2x6 bottom

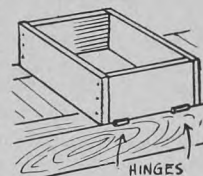


piece, with 2x4 uprights and 2x6 braces. Heavy strap iron guides are bolted through the top member of the rack, while the weight is carried on short pieces of pipe or bars slipped through holes in the uprights. The feed bunk

may be raised up out of the way or removed entirely when cleaning out the yard.—I.W.D.

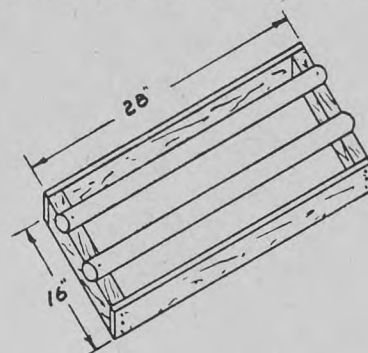
## Sanitary Feed Box

To make a feed box that is easy to clean, attach it to the manger with hinges as shown instead of nailing it in place. It can be quickly cleaned by turning it over.



## Keeping Cows From Gutter

Many times we find dairy cows that show a tendency to stand in the gutter with their hind feet. The diagram shows



a satisfactory remedy. A frame should be made of rough 2x4's so as to fit the gutter loosely in width and extending nearly across the stall. The cross pieces should be notched on top so that the stout round pieces can be half mortised in and then fastened firmly. When this is placed in the gutter and the cow stands on it, she finds it so uncomfortable that she will step forward where she belongs.—I.W.D.

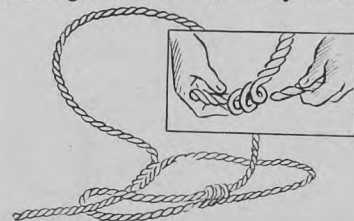
## Dairy Gutter Guard

Here is an idea to break a cow of standing back in the gutter. Make a rack to fit in the gutter, slanted from the bottom of gutter immediately behind the cow up to the top of the opposite side. Space the 2x2's so her dew claws would catch when she steps back and through it, and you will have no more trouble with her getting dirty.



## A Good Rope Halter

The figure shows an easy-to-make





rope halter that can be adjusted in size to fit everything from a young calf to a large draft horse. Bind both ends of the rope, use a punch or other pointed object to form loops in the strands of the rope as shown in the detail and run the rope through the loops. Stores handling rope will find this halter has sales possibilities.

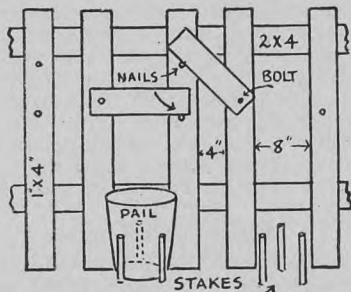
### Non-slip Knot

When tying livestock by the neck with a rope, it is rather important to avoid having a slip-knot since otherwise the animal may hang itself. The execution can be prevented by making the knot as shown at right. The same knot can be used for making a rope halter for a cow or horse.



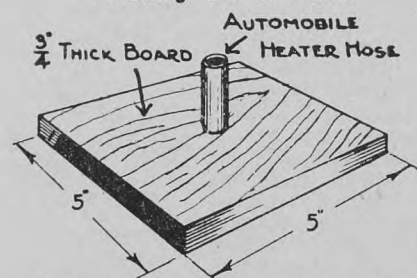
### Calf Feeding Methods

The old sloppy method of getting one's fingers sucked off is not the only way of teaching calves to drink out of a pail. One reader nails a piece of leather about four inches long to the end of a short stick, bends it at right angles to



the stick, and wraps it with string. By dipping this in the milk and letting the calf suck at it and gradually bringing it down to the surface of the milk, the calf will be drinking before he knows it. Another uses a baby's bottle and nipple and brings this down to the milk in the bucket. The diagram shows a handy panel for feeding calves during and after they learn to drink. This can be set across the corner of a box stall, fastened to the pasture fence, etc. Probably it would be more portable and convenient if the stakes were replaced with a trough with fairly high front and partitions to hold the pails and also any feed to be given later.—I.W.D.

### Teaching Calf to Drink

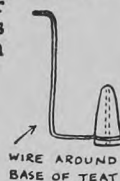


The sketch shows a very handy gadget for weaning calves that refuse to drink from a bucket without the aid of fingers.

Use a five-inch square piece of light  $\frac{3}{4}$ -inch board with a  $3\frac{1}{2}$ -inch piece of automobile heater hose inserted in a hole in the centre. Hose may be tacked in with small nails at the bottom edge. This will float on the milk and works like a charm.—I.W.D.

### False Teat for Calf

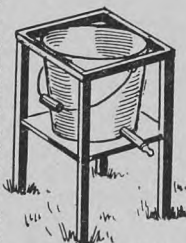
We had a calf which wouldn't take the fingers held in the pail. It was becoming very weak so we decided to make an artificial teat and it worked. We took a piece of poplar branch about three inches long and smoothed it down



to the shape of a cow's teat. Then we made a hole through the centre. Around the large end we fastened a large wire allowing at least 12 inches upright for the handle. When feeding the calf we held the teat by the wire handle. We believe that it saved the calf's life, considering the condition it was in before-hand.—Clifford Ring, Neudorf, Sask.

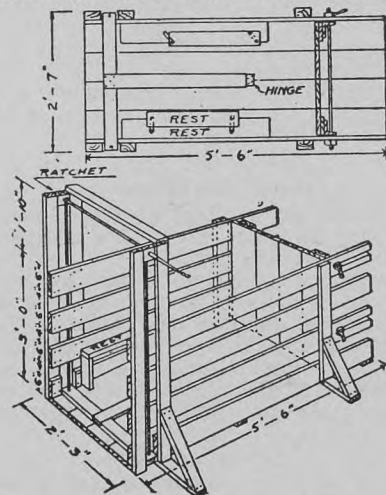
### Feeding Orphan Lambs

Here is an idea we worked out for feeding several lambs which had to be fed by hand. Feeding them from bottles was too slow. Take a pail, drill a hole near the bottom, solder on a short length of pipe, with a slight rim or bulge at the other end over which we could slip a nipple without being pulled off. A frame was made to hold the pail, and this is set where the lambs can help themselves. Works fine, and the lambs learn to drink quickly.—I.W.D.



### Hog Breeding Rack

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bevel the lower edges with a plane, and nail it tight in the bottom of the trough. Now the pigs can get all the feed and there is none left to sour.—I.W.D.

### Hogs Can't Upset It.

Hogs can't root this trough around the floor of the pen, let alone upset it. The dotted lines show where the side boards of the feed trough are let into the ends. There is nothing but a sloping side for the hog to get his snout against.—D.C.R.



### Dry Mash Self-feeder for Poultry

Old or leaky pails can be used in three ways to provide a dry mash self-feeder for poultry. Poultry cannot get into the feeder and waste the dry mash. The simplest way is to make a three-inch hole in the centre of the bottom of the pail and set it over and old pan supported by two strips of wood or iron.

A second method is to make a cut on one side of the pail about six to eight inches long and about two inches above the bottom. The side above the cut is then bent in so as to provide an opening. The self-feeder pail can then be hung on a wall or post about three or four inches above the floor.



A third method is to cut both sides of the pail so that the cuts are opposite each other and about two inches from the bottom. Then bend in both sides so that two feed openings and troughs are provided. The self-feeder pail can then be suspended on a piece of wire about four inches above the floor. When suspended in this way, the feed is afforded more protection from rats and mice.



### Cafeteria Furniture for Chicks

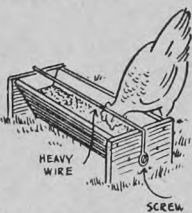
Here are three gadgets for helping little chicks to help themselves. On the left is a waterer. It consists of a deep pie plate with one-half inch board cover having holes bored in it as shown. The middle cut shows a chick feeder. It is cut from one of these round cardboard oatmeal containers and allows the chicks to feed while preventing them from getting their feet into the dry mash. On the right is a self feeder that can be moved easily from place to place. It is an old syrup tin, with the handle left on. Holes are made in the sides for the chicks to feed through, while a funnel, upside down with a



cork in the end, keeps the feed flowing out to within the reach of the chicks

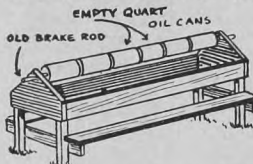
### Poultry Trough Saves Feed

One of the simplest and most reliable feed troughs for keeping hens from soiling the feed is this one. It resembles an ordinary feed trough except that there is a strong wire fastened across the top, running from end to end. This simple device prevents the hens from getting their feet into the trough and wasting or contaminating the feed.



### Guard for Poultry Feeder

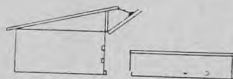
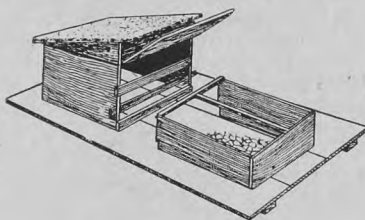
A simple way to keep chickens from roosting on and dropping into poultry feeders is shown in the diagram. Take empty tin cans with the tops still on, punch a hole in each end just large enough to fit over an old auto brake rod long enough to reach the length of the feeder. Slip the proper number of cans over the rod, then fit it in slots cut in each end of the feeder. When chickens light on top of the feeder, the cans revolve and they will soon leave it alone.



long enough to reach the length of the feeder. Slip the proper number of cans over the rod, then fit it in slots cut in each end of the feeder. When chickens light on top of the feeder, the cans revolve and they will soon leave it alone.

### Coop and Run for Chicks

This combination coop and run for small chicks provides protection day and night. Ordinarily 3/4-inch lumber is needed for construction. The roof can be made rainproof with sheet metal or roof felting. Eight 3/4-inch holes near the roof will provide ventilation when the hinged door is closed at night. The small feed run is easily moved and a



loose slat permits easy access to the inside of the coop. The entire coop and run may be set on a platform to provide a dry floor which can be easily cleaned. The coop is 20 inches from front to rear and 12 inches deep at the eve. The feed run is 24 inches in length and six inches deep. The width depends on the number of chicks.—H.J.K.

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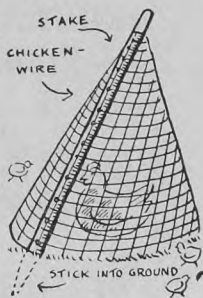
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### Chicken Teepee

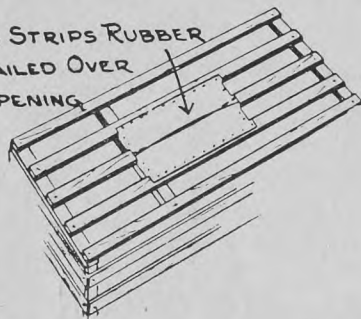
A portable teepee that is easy to move can be made from a sharp stake and a piece of chicken wire rolled into the shape of a cone and nailed to the stake, which is driven in at an angle. It is an easy matter to move it to a clean place in the yard.—A.S.W.



### Rubber Top Crate

Here is rubber top catching crate for poultry. One top slat of an ordinary

2 STRIPS RUBBER  
NAILED OVER  
OPENING

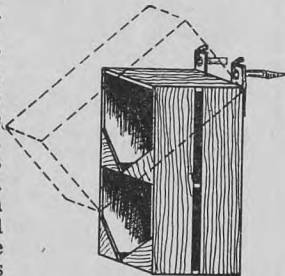


crate has a piece cut out, and two strips cut from an old inner tube are nailed over the opening with one lapping about an inch over the other. Thus the door is always closed, as the strips go back in place after a fowl is placed in or taken out of the crate. Even if a fowl should get his head through the opening, it could not get out.—I.W.D.

### Nest From Apple Box

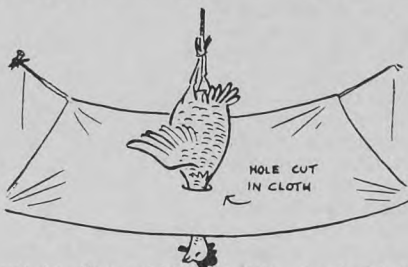
An economical, easily cleaned poultry nest is readily made from an apple or orange crate.

The bottom boards are removed leaving only the two sides, the two ends and the centre boards. Angle pieces are cut from the bottom boards and nailed to the front as shown in the sketch. The angle pieces prevent the birds from roosting on the front of the nest. Two pieces of  $\frac{3}{4} \times \frac{1}{8}$ -inch strap iron are fastened to the back to serve as hangers. A  $\frac{3}{8}$ -inch hole in each piece of strap iron allows the nest to be hung on two hooks screwed into a wall. The nest thus hinged can be swung out from the wall to allow litter to fall out. The nest can also be easily lifted off to permit more thorough cleaning.



### Saving Feathers

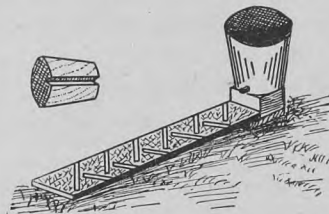
To save the feathers hang the bird up. Next hang the sheet up high enough for the head and neck to go through the hole up to the shoulders through a hole



cut in the middle of the sheet. It is easier saving them this way than gathering them off the ground.—Mrs. A. Helm, Ebenezer, Sask.

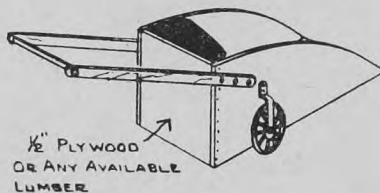
### Water Supply For Bees

A wooden pail or a small barrel, or any other suitable water container, plus a sloping board covered with burlap, can be used to make an ideal means for supplying water for bees. The water container is fitted with a grooved plug in the side near the bottom. The groove should be made just large enough to allow water to drip slowly on to the burlap covered board. The burlap is held on the sloping board with small wood cleats arranged as shown in the sketch so as to retain the water on the board.



### Improved Feed Cart

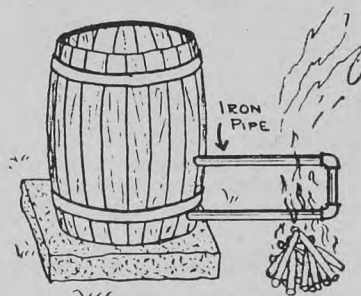
This is a diagram of an improved feed cart which is very helpful in livestock feeding. It is made of half-inch plywood or other solid material, preferably glued before being nailed or screwed together. The front and top are open and the front edge is reinforced with a strip of



heavy galvanized iron or light steel. The cart is carried on two small wheels, set so as to project about two inches below the bottom and far enough back so the front edge can be lifted clear of the floor when the handle is pushed down. This cart can be loaded simply by pushing the front into the feed.—I.W.D.

### Heating Water

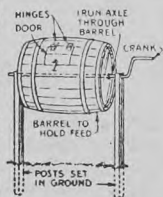
The sketch shows how to heat water in a barrel for scalding hogs, cooking feed, and so on. Bore a one-inch hole  $1\frac{1}{2}$  inches from the bottom and another of the same size about nine inches above it. Put  $\frac{3}{4}$ -inch pipe through these holes



and extend them out about five feet similar to the coil in a furnace, using elbows and a union. If the barrel is of wood, the threaded ends can be screwed into the one-inch hole. One of the metal collars can be screwed on inside and out to make a tight joint. Now build a fire under the outer end of the pipe coil and the water in the barrel will soon become scalding hot and keep that way as long as the fire is kept up.—I.W.D.

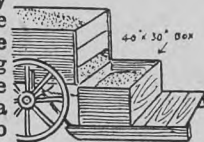
### Dry Feed Mixer

Dry feeds can be mixed quickly and easily with this outfit. An ordinary wooden barrel is mounted between two posts on an iron rod which is bent at one end to form a crank. A door is cut in the side of the barrel and fitted with hinges and a hook to hold it tightly shut.



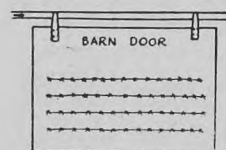
### Seed Box Filler

Filling the seed box is a hard job if one has to scoop every pailful out of the wagon box. With this device it is a bit easier. Simply trail a small stone boat behind the wagon by hitching it to the rear axle with a chain. Put a box big enough to hold a few bags of grain on the stone boat, open the end gate and the seed will run into the box. The box should be a little wider than the wagon box to prevent spilling.—E.A.A.



### Protecting Stable Door

I am submitting this idea in the hope that it may be of benefit to someone.



String three or four strands of barb wire on the sliding door of the stable. It will prevent horses which

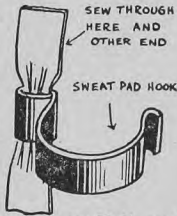


are running loose from rubbing their rumps on the door when their tails are itchy. It is a sure cure. I have it installed on my door and it is 100 per cent efficient. Horses often break doors by this habit.—M. R. Wenner, Roblin, Man.

### Re-attaching Sweat Pad Hooks

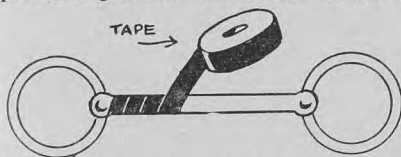
Long before a sweat pad has ceased to be useful most of the hooks come off. The salt from the perspiration attacks the wire fastening, causing it to rust and in turn the cloth is greatly weakened.

To re-attach, remove old wire staple with pliers and then cut a piece of soft leather two inches long by one-half inch wide. Roll it and push it through loop end of hook. Then flatten out ends and sew to sweat pad in a fresh place with hemp or other strong thread. The hook will now hold on longer than with its original fastening.—Robert J. Roder, Reist, Alta.



### Preventing Frosty Bit

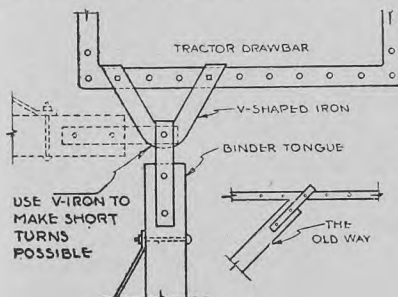
I am sending you what I consider a very necessary and humane idea for preventing a bit from becoming frosty.



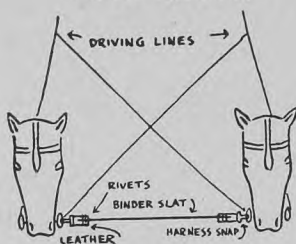
Just wrap tape around the bit from end to end and the horse will thank you kindly every time the bit is put in his mouth. The tape wrapping will last almost indefinitely.—H. R. Hinchcliff.

### Keeping Lines from under Tongue

A chain hung from the front end of the tongue of the wagon or field implement will prevent the lines or bridle rein from catching under the tongue as the horses swing their heads to fight flies.—I.W.D.



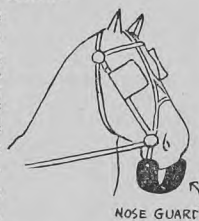
### Bridle Spreader



It is a bad business, and one that causes annoyance to the teamster, when one of his horses insists on biting the other. Here is a simple and effective means of preventing it. Take an old binder canvas slat and rivet a snap on each end of it and fasten it to the bits of the horses. The biter will stay put.

### Nose Guard

A very good nose guard can be made by attaching a piece of old belt or stiff leather about 14 inches long and 4 inches wide to the rings of the bit. Attach the guard so that there is a clearance of two inches between it and the horse's lip so that it will swing freely as the horse moves along. The horse can breathe more freely than with the ordinary nose guard.—Mike R. Hofer, Rockyford, Alta.



### Adjustable Nose Bag



This adjustable arrangement for attaching the nose bag is very handy. The slide makes it possible to adjust it for any horse after placing it on his head. The wooden block will grip wherever it is placed. Horses' heads vary in size and with this arrangement you don't have to keep their nosebags separate.

## SECTION 10.

# Hitches -- Tractor and Horse

### Tractor Hitch

A V-shaped device as pictured in the drawing for hitching a binder or other

short tongue implements to a tractor will go a long way to prevent breaking the tongue when making short turns in the field. The new hitch allows a short right angle turn. With the old hitch this is not possible without breaking the tongue.

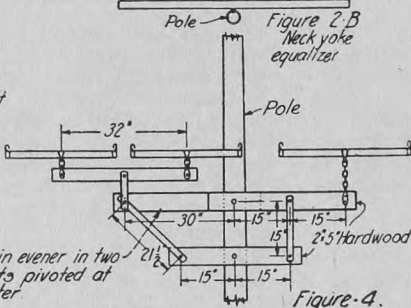
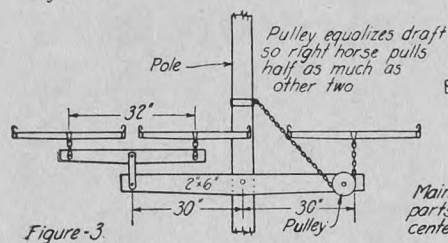
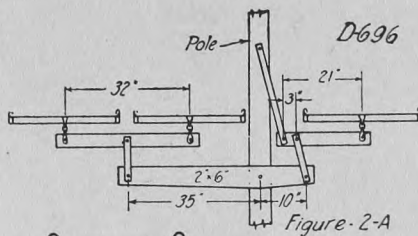
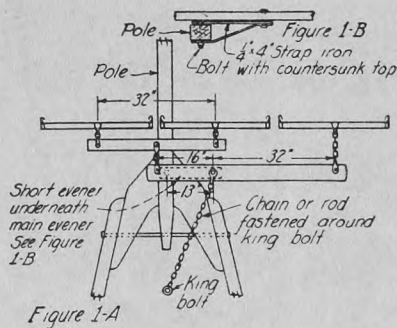
### Three-horse Evener

Here are four different ways to make a three-horse evener. Fig. 1-A shows how it can be done by using a short evener under the main evener with the end chained back to the king bolt. Fig. 1-B gives the detail of the short evener as attached to the pole. Fig. 2-A shows another method with straps bolted to the tongue, and Fig. 2-B the general



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- Prevents accumulation of hot engine sludge.
- Eliminates sticky rings.
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*Four different ways of making a three-horse evenner.*

design of the neck yoke equalizer. Fig. 3 utilizes a chain and pulley to give the single horse an even draft with the other two. In Fig. 4 notice that the main evener is in two parts pivoted on the draw bolt, while the draft all comes on the short rear evener. The measurements are all given, including the dimensions of the different eveners.

## Hook-up for Tandem Discs

Hook-up (Fig. 5) can be made by anyone the least bit handy with tools. A shows the forecarriages of the discs, B and C show the left disc and D and E the right disc, F is a logging chain, G an eight-foot oak evenner and H another logging chain. The small drawing shows the clevis arrangement at each end of the spreader bar G. Adjustments to get proper alignment are easily made. In coupling up such an assembly three discs should overlap. This avoids ridging to some extent and you are sure of cutting all the land. Care will have to be exercised in turning corners so as not to get the chains caught in the lugs of the tractor. Take it all the way through it is

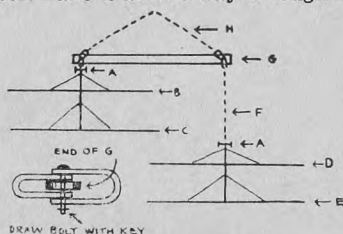


Fig. 5

a fairly satisfactory outfit for tractors. Some misses will be made at the ends but these can be gone over when the field has been disced. When working on stony ground this is a satisfactory hook-up because when one disc strikes a stone the equalizer bar will swing and the obstructed disc is drawn over the stone rather gently then both discs swing into parallel position.—George W. Caldwell, Ridgedale, Sask.

This is a tractor hitch for weeders or drag harrows that is the acme of simplicity but which can be used only on quite level land. It was developed in Colorado and is recommended by the Montana

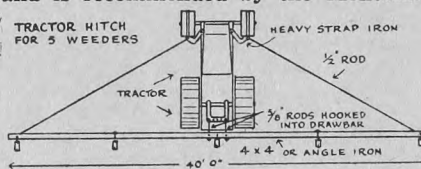
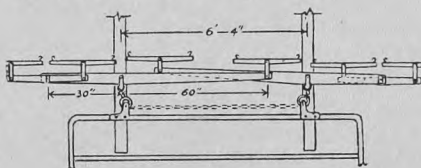


Fig. 6

authorities. A reader at Rouleau, Sask., writes that he has used this hitch successfully with drag harrows. He has a stay rod across from the middle of the cable to the draw bar.

Fig. 7 (above right), is a three-implement hitch, also a Montana design. It is a complete unit in itself and no additional rear extension truck is needed. It is very flexible for use on uneven or rough ground. The turnbuckles are not essential.

Fig. 8 (on the right), is a 10-horse hitch for a one-way from a drawing by Prof. Evan Hardy, of Saskatoon. It is so designed that the centre of the draft is in the centre of the eight-foot implement. The main doubletree is seven feet eight inches long with the clevis in the middle. Attached to it are two doubletrees, 50 inches between clevises, divided 40 inches and 10 inches for one and four-horse draft respectively.

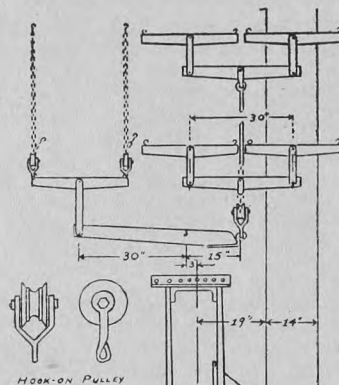


### SIX HORSE MITCH FOR DRILL OR PACKER

Above is a simple six-horse hitch for a drill or packer. The main doubletrees are seven feet six inches long, divided 30

inches and 60 inches. The chain and pulley attachment is used.

Below is a six-horse tandem hitch for a 14-inch gang. It and the one following are from drawings by Prof. Hardy. In this one the horses are three abreast and the side draft is three inches. Note



6 HORSE TANDEM  
EVENER ON A 14" GANG  
SIDE DRAFT - 3 INCHES

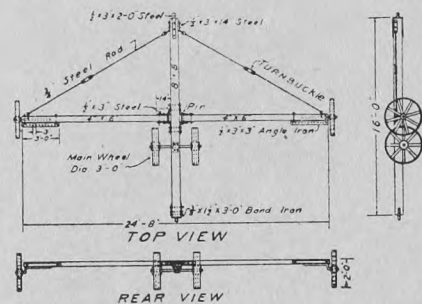
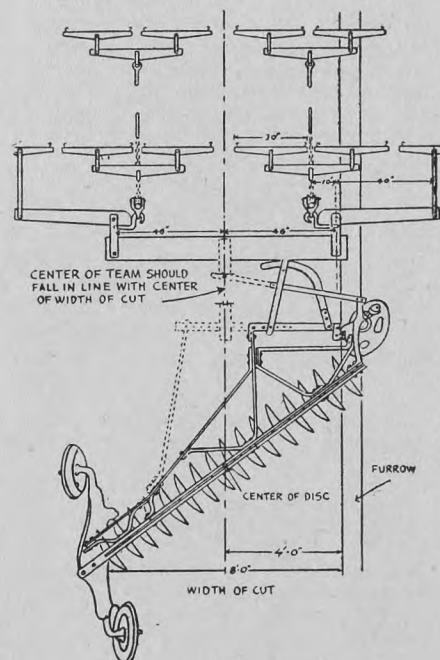


Fig. 7

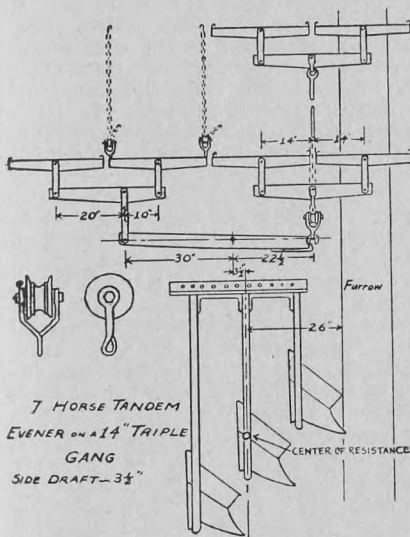


**Fig. 8**



that the centre of resistance of the plow is 19 inches from the edge of the land while the centre of draft from the horses is 19 plus 3 or 22 inches. The main doubletree is 45 inches net, divided 30 inches and 15 inches, while the singletrees are 30 inches between centres.

The last hitch shown is a seven-horse hitch for a 14-inch triple gang. The centre of resistance is 26 inches from the edge of the land and the side draft is  $3\frac{1}{2}$  inches. On the main doubletree four horses pull against three and the division is 30 and  $22\frac{1}{2}$  inches. On the outside doubletree two horses pull against one and the division is 20 and 10 inches. The inside doubletrees are 28 inches between centres of clevis holes.

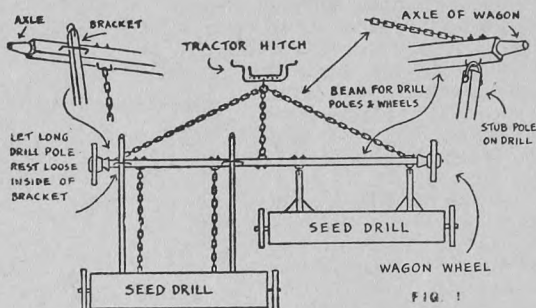


The response to the request of The Guide for designs of home-made hitches for linking up two or more horse-drawn machines behind a tractor was generous. Many sketches with explanations were received and four of them, of particular value at this season, are published herewith. They have all been put to the test of practical use in the field and have given satisfaction. Other designs will be published in due course, including several binder hitches.

### Two-Drill Hitch

Take two wagon wheels and a piece of timber wide enough for two drills (fig. 1). Then bolt the axles of a wagon to each end of the long pole or timber and put on the two wagon wheels. If you have not as many chains as are shown in the sketch you can use a long iron rod with a few links in each end so that the rod will not break.

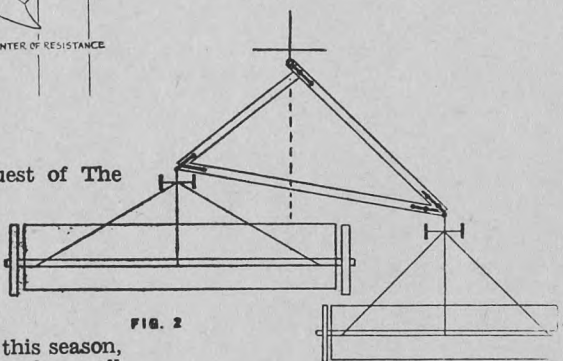
If you want to haul three drills, have the long timber one-third as long again and hitch the third drill on the left



side using long tongues, while the drill with the stub tongues is hitched in the centre. In that case the long timber would have to be strengthened.—J. M. Holman, Lougherd, Alta.

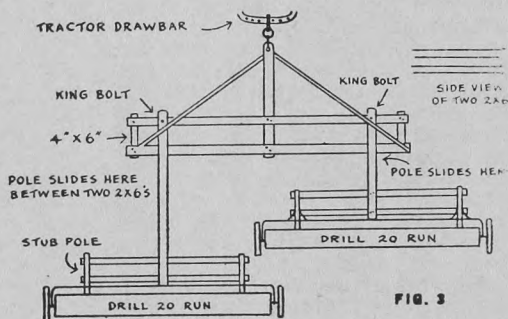
### For 28 and 20-Run Drills

This is a hitch (fig. 2) that we have used for several years with complete satisfaction. Our drills are 28 and 20-run and once when seeding breaking we adjusted an ordinary chain from the tractor draw bar to the frame of the front drill to steady it. They can be hitched very close as the wheels may rub the frame or running board on the corners without doing the slightest harm. The hitch is made of  $4 \times 6$  beams joined by  $\frac{1}{2} \times 3$ -inch irons.—Harvey Bros., Flaxcombe, Sask.



### Frame Tractor Hitch

Here is a sketch of a frame tractor hitch I have found to be quite satisfactory.



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tory and simple to make (fig. 3). No wheels are necessary, but with a little alteration it could be changed into a truck with the addition of two wheels if desired. As shown, the frame work is composed of four 2x6's 14 feet long for crosspieces and pieces of 4x6 each two feet long for the ends. The short pole is a five-foot 4x6, and the braces are two pieces of angle-iron each eight feet nine inches long. The machines are hitched to the frame by means of king bolts on which the tongues pivot. The poles slide between the two rear 2x6's when turning. The frame is attached to the tractor draw-bar by means of a ring and two clevises. An iron step or leg is fastened underneath the front end of the frame pole so that it doesn't have to be raised to couple or uncouple from the tractor draw-bar. This leg should be about eight inches long.—J. R. Duncan, McKenzie Island, Ont.

### Drill After Tiller

The accompanying diagram (fig. 4) shows a very successful hitch for drawing a drill after a tiller. The drill is hitched behind the tiller as closely as it will work. Use a stub tongue in the drill about two or three feet long. On top of this put a 2x4 hardwood tongue (birch will do) that reaches to the frame of the tiller. Put a bolt through the 2x4 and the stub tongue so as to form a pivot that will turn easily. Fasten a U-shaped iron over the 2x4 to the frame of the tiller so that it will allow the 2x4 to slide freely. Hook a cable from the left corner of the drill frame to the right corner of the tiller frame and another from the right corner of the drill frame to the left corner of the tiller. The drill will then make short corners. The drill we used is the same width as the tiller. We used this hitch last year and it worked perfectly.

The diagram shows how the hitch is applied and from it any farmer will know just how to go about making it. Very little new material is required for

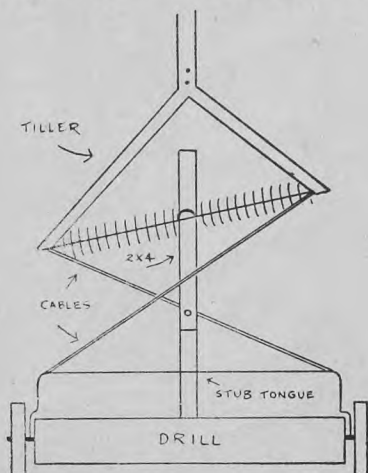


FIG. 4

making the hook-up.—Carl A. Tatroe, Sedgewick, Alta.

### Combination Hitch

I have primarily designed this hitch for hilly land but it will work equally well on level land. After trying all kinds of hitches, none of which would work on sidehills, this one finally filled the bill. I think I can safely say this is the only hitch I have ever seen that will successfully work any place that a Wheatland itself will work.

All the material used in this hitch was salvaged from an old individual beam plow used in the early days, with the exception of one wheel. BC and CD are beams from said plow, CD being two welded together. AB and AC are levers off two beams. The wheels G are the small wheels that are in front of each bottom of the plow. The castings which hold these wheels on the draw-bar are sawed off until they match the height of the tractor draw-bar and then welded to the draw-bar as shown, with provisions being made to allow enough room for the wheels to turn freely.

Before any measurements are taken great care must be exercised in proper alignment of the machines to be used, especially that there be no appreciable amount of side draft. If these precautions are not taken trouble must certainly be expected.

Once the machines are aligned then they should be dropped to their working positions and drawn together until about one and one-half feet separate the back and front wheels. The full cut of both machines must be measured accurately and divided in two. This distance will be the draw-bar BC. Under this method any two machines may be used regardless of size, but they should

preferably be the same make. However two machines with the same draft in proportion to size may be used. Next cut a board to equal the computed length of BC and lay in position as illustrated in diagram.

CD may also be a board laid at right angles to BC and corrected with a square.

Enough distance should be allowed between point B and first machine for linkage. All points should be flexible except AC and AB which are welded solid to BC. Wheel F is an old salvaged wheel which is not too high. The brace ED and shaft FE will vary with different machines and may be measured as before with boards. Once the complete layout is made in boards then it may be transferred to the steel parts.

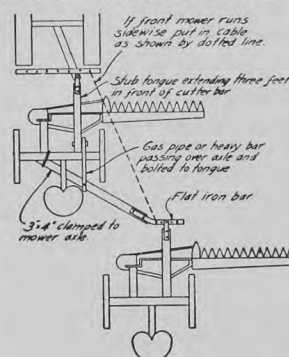
AC and AB should be the same length as BC to allow the maximum turn. These parts to be solidly welded or bolted together. CD must be joined to CB with a swivel link which will allow a certain amount of movement in all directions. The same principle to be followed in connecting first machine to draw-bar. Point E should be equidistant from both wheels and be made in the form of a U so as to allow about six inches free movement of drag-bar CD ahead or back. The shaft FE to be bent at point E to form an eye which will slide on U bar. U bar can be attached to front machine, with every possible care being taken as to height and position in reference to wheels. In some cases this part may have to be redesigned to fit your particular machine. The purpose of the six inches travel is to act as a guide in balancing the load of two machines. Contrary to popular belief I find that the back machine pulls the lightest in nine cases out of ten.

I have successfully seeded two crops with my two Wheatland combines on sidehills equal to the hills of the Big Bend country of Washington. So far I have found no misses in the crops. A solid hitch has many advantages over a cable hitch on sidehills since there can be no sag in a solid bar.

### Two Mowers Behind Tractor

This illustration shows a simple hitch for drawing two mowers. A hardwood scantling, 3x4, is clamped to the front mower. A fir 4x4 would do as well. On the end of it a flat iron bar carries the stub tongue of the rear mower. An iron bar, passing over the axle, is bolted to the tongue and to the scantling to hold it up. The stub tongue of the front mower extends three feet in front of the cutter bar. To prevent side swing a chain or cable runs from the drawbar of the tractor to the bar which hitches to the rear mower. By placing the two mowers in their proper relative positions the length of the different parts of the

hitch can be readily calculated.





## Four, Five, Six and Eight-Horse Hitches

The four-horse hitch shown in fig. 1 is for a 14 or 16-inch sulky plow, with the teams strung out tandem and two of the horses walking in the furrow. This makes it easy to handle the horses. The hitch is in the true centre of the draft, eliminating side draft on the plow and reducing the power required.

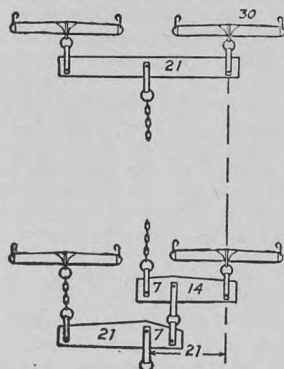


Fig. 1

A 42-inch wagon evener is used in the lead and the chain is long enough so that the wheel team will not bump their knees on the lead evener. The hitch works equally well on a wagon and can be used on a binder. On the wagon, buckstraps and tie chains should not be used. Use lines on both lead and wheel teams.

Fig. 2 shows how to make a simple five-horse abreast evener. The main evener is 78 inches between clevis holes. To it are hitched two eveners 45 inches long, divided nine inches and 36 inches since the middle horse has to pull against the other four. A space of six inches is left between these two eveners. The iron rods are made long to bring the middle horse as far forward as the others.

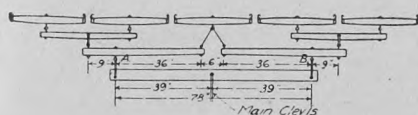


Fig. 2

A five-horse tandem evener is shown in fig. 3. The rear evener is divided six and nine inches, as shown at A, since the lead team pulls against the other three horses. The middle horse of the wheel three pulls against the two outside wheel horses. To equalize the draft between these three horses two pairs of steel bars are bolted on the wooden evener at the outer end as shown at B, but left to swing freely. The division of the bars is nine and 18 inches. The rear whiffletrees are 28 inches long and the front ones 30 inches. The evener for the lead team C, is 36 inches long. The cable or chain, D, is just long enough to prevent interference.

In the six-horse tandem evener, fig. 4, the long evener, A-C, is 56 inches between clevis holes and is divided evenly, with B in the exact middle. The rear evener, E, is 30 inches long, divided 10

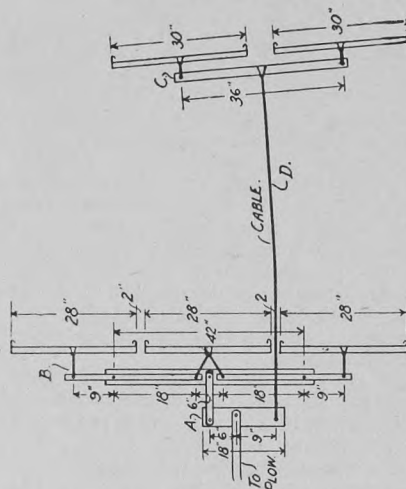


Fig. 3

and 20. The singletrees are all 28 inches long, and the doubletrees the same length, 28 inches.

Here, in fig. 5, is an arrangement for stringing three teams out tandem. The front evener is an ordinary one. Working back the next one is 22½ inches

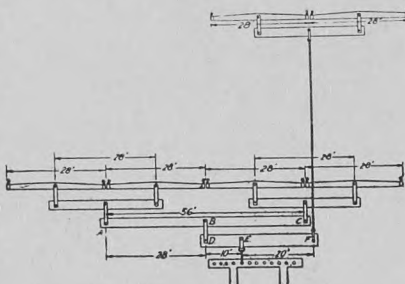


Fig. 4

long, divided 7½ and 15 inches, with one horse pulling against two. On the next one, three horses pull against one and the division is 7½ and 22½ inches. Then these four pull against one with the next evener, 4½ and 18 inches. Finally the five pull against the sixth,

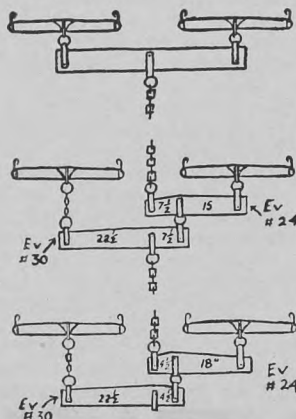


Fig. 5

which is given an advantage of 22½ inches to 4½ inches. The advantages of

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tandem hitches are that they are cooler on the horses and side draft is not a problem.

Finally we have an eight-horse hitch in fig. 6, where the horses are arranged four and four. There is little side draft and only one chain or cable is required. Note, where the main hitch is connected with the plow, that short chains making a crotch extend back to small clevises to facilitate turning the plow at

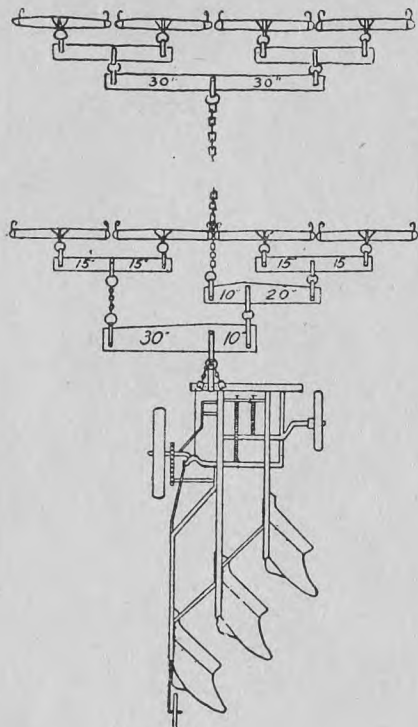


Fig. 6

the corners. The lines go to the lead horses but a short strap is attached from the bits of the two outside rear horses to the lines. Lead lines extend from the bits of the rear horses to the singletrees of the lead horses. The lengths used in making the eveners are all shown clearly in the illustration

### Tandem Plow Hitch

Someone asked for a hitch for hauling a two-furrow plow behind a three-furrow tractor plow. I have used these improvements by attaching a cable or long chain from the left-hand side of the tractor draw bar through a ring wired to the left beam of the three-furrow plow, through a clevis bolted to the tongue of the two-furrow plow and through to the draw clevis of the second plow. If it is desired to hitch the two-furrow plow up closer to the three-furrow plow discard the wood tongue and make a V-shaped devise from angle iron to haul and guide the two-furrow plow. If both plows are the power-lift type the usual turns can be made on the headlands. Otherwise it will not be possible to make short turns at the ends of the fields.—T.N.S., Cadogan, Alta.

### Steers from Chain

This tractor hitch for two binders takes only a few pieces of flat iron and a 14-foot logging chain. The diagram shows how it is attached to a McCormick-Deering tractor, but of course it can be hitched after other makes.

A crossbar is bolted to the drawbar of the tractor behind the differential. This crossbar is drilled in the centre and a stout piece of flat iron about three feet long is drilled and bolted to the crossbar and the side hole in the tractor drawbar. This being on an angle will enable the tractor to follow the grainside while the first binder takes the full swath.

In place of the tongue in the first binder a stub pole about two feet long, with flat clevises on the end for hitching to the tractor, replaces it.

The second binder also has a two-foot stub tongue. The hitch for the horses is left on this binder; only the eveners removed. A logging chain at least 14-feet long is attached in place

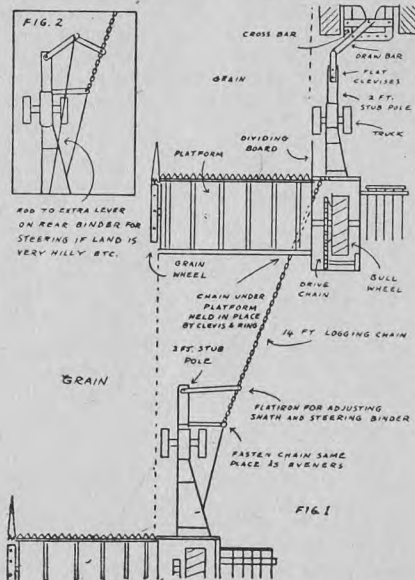


FIG. 1

of the eveners. The chain is then passed under the first binder and held in place by a clevis and ring fastened to the frame of the binder where the truck of the binder is attached to the binder proper.

On the stub tongue of the second binder is a flat iron 2½ feet long bolted to the front end of it, with the other end bolted to the chain. This iron steers the truck of the second binder. It adjusts the swath by turning the binder in or out. A study of the diagram will clarify how it works. In turning corners turn the tractor when the first binder is two or three feet out of the grain.

If the field is very hilly or irregular and the second binder has a tendency to go off its course a contrivance for steering it can be made, Fig. 2. We have used this hitch on hilly land and on quite small fields.

To move the outfit remove the chain

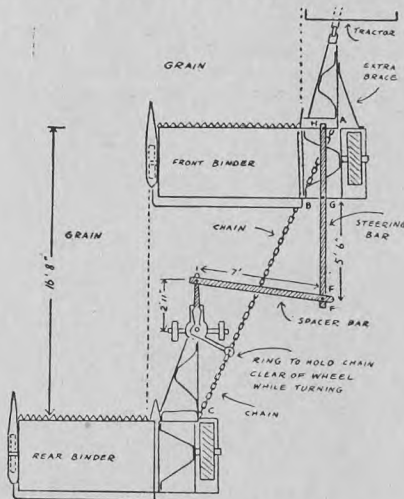
from the front frame of the first binder and attach it to the rear part of the frame. The chain on the second binder is attached to the end of the stub tongue. This makes the two binders follow each other.

### Using Steering and Spreading Bars

When two binders are hitched behind a tractor there is considerable side draft. Do not expect too much from a home-made hitch in keeping the corners square. They should be made somewhat round.

The hitch on the first binder must be well braced as it has to pull the second binder. It is advisable to take the truck off the first binder as it simplifies turning the corners. The rear binder is drawn by a chain or cable which is fastened to the front binder at A. The chain passes under the frame and almost directly under the sprocket which drives the canvas. It is held down by a block so it will not interfere with the sprocket and should be held in place by a ring or wire loop at B, to prevent it swinging at the corners. It is fastened to the rear binder frame approximately at C. The entire length of the chain is nearly 18 feet when the binders are spaced properly.

The success of the hitch depends on getting the binders spaced properly and on having the steering bars the right length. The length is given at GF. The length of the spacer bar must be adjusted to have the rear binder cut nearly



the full swath. It is about seven feet long. The length of the spacer bar will vary according to the angle the trucks make when turning. This varies with different makes of binders.

The spacer arm hinges at both ends, where it is fastened to the steering bar and to the stub tongue of the rear binder truck. The steering bar can be clamped to the frame of the front binder with U-bolts at H and G. A straight grained 4x4, or a strong piece of angle iron will serve for steering and for spacer bars.

Occasionally it is necessary to weight the rear binder truck with sand bags.



## One-way Behind Binder

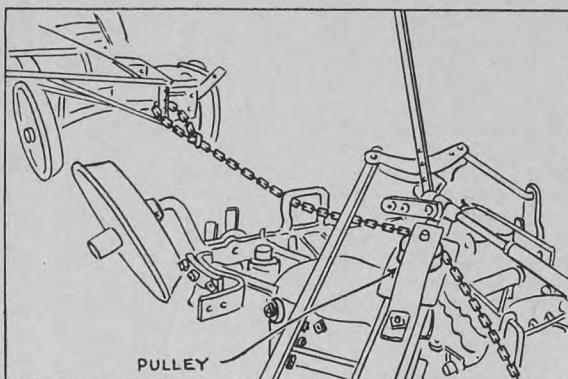
This illustration is from a leaflet issued by the extension department of the Manitoba department of agriculture.

It is quickly and easily constructed by extending a chain from the tractor drawbar to a point on the rear of the one-way disc that is directly in front of the stub tongue of the binder when the latter is in the correct operating position. At this point a pulley should be solidly bolted so that the chain may run on it, as it will do on the corners. Carry the chain back to the stub tongue, but first passing it through the U guide bolted on the rear of the disc frame, as shown in the picture. This guide gives more positive control on corners. The chain can be secured to the truck at the base of the stub tongue.

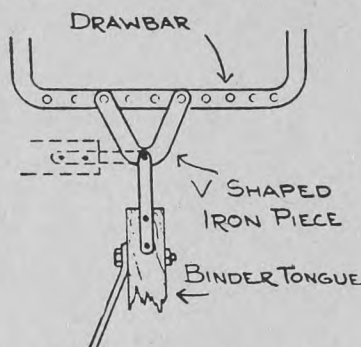
It might be necessary on some makes of one-way discs to raise the pulley a short distance above the frame to allow the chain to clear the framework. This can be done by bolting an L-shaped standard to the frame and supporting it with braces. The pulley can be secured to the top by means of a clevis arrangement. Using this hitch it is not necessary to run the chain back through the guide, the binder following satisfactorily from the pulley.

## Safer Binder Hitch

Here is a diagram of a simple attachment to the tractor drawbar for



hooking up the binder, which has stopped split binder tongues for us. The V-shaped attachment shown makes possible a sharp, right-angled turn, and



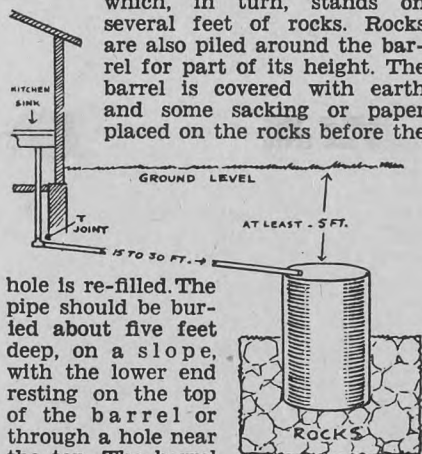
a neater job of cutting the field. The attachment is made from strap iron a little lighter than the drawbar, such as a heavy wagon tire.—I.W.D.

## SECTION 11.

# Water, Drainage and Heating Systems

## Cheap Sewage System

This system is composed of a pipe leading from the kitchen sink, under ground to a buried oil barrel or box which, in turn, stands on several feet of rocks. Rocks are also piled around the barrel for part of its height. The barrel is covered with earth and some sacking or paper placed on the rocks before the

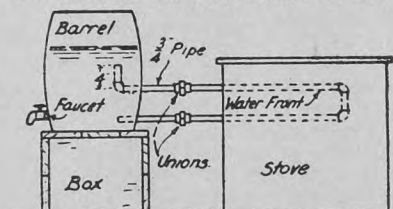


hole is re-filled. The pipe should be buried about five feet deep, on a slope, with the lower end resting on the top of the barrel or through a hole near the top. The barrel should have no bottom and the stones beneath should be covered with coarse

gravel. The short piece of pipe from the sink connects with the horizontal pipe, which should be 12 feet long and four inches in diameter. Use a T-connection so that the plug can be removed and the horizontal pipe cleaned out. This system should be used to dispose of liquid waste only. The scraps are better fed to the hogs.

## Hot Water Heater

This heater can be made cheaply and will keep lots of hot water available. It is attached to the kitchen stove. Most



stoves are made with holes for putting in a water front. Use  $\frac{3}{4}$ -inch piping and a barrel with a faucet. The unions can be secured at any hardware store.



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All Types

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2. Barrel Pumps.
3. Semi-Rotary Pumps.
4. Centrifugal Pumps.

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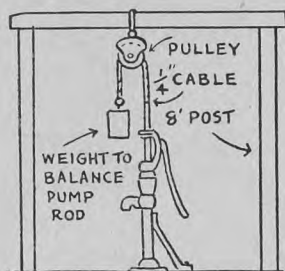
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## Easier Pump Operation

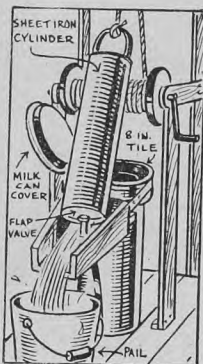
In a deep well, the plunger and long pump rod may weigh a good many pounds. To avoid lifting this dead



weight every stroke and letting it drop back with a jerk, many owners balance it with a rope run up over a pulley, as shown in the above diagram. This permits the use of a smaller motor and saves much wear and tear on the pump. A similar result can be secured by using heavy coil springs which are compressed on the down stroke and help to lift the plunger on the up stroke. The pulley should have ball bearings, and the weight should just about balance that of the plunger and rod.—I.W.D.

## An Improved Windlass Well

This simple, pumpless well performs with surprising ease and efficiency. An 8-in. tile leads down to water which is only 14 ft. below ground. The top of the tile bell end is provided with a milk can cover with which it is closed when the well is not in use.



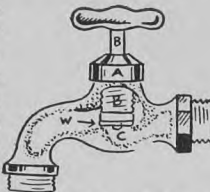
A rope winds about a hand turned windlass, runs up over a pulley in the top of the well house, then extends downward and is tied to the 6-in. sheet iron cylinder which is the bucket. This bucket has a flap valve in the bottom and a strap iron hoop on the top. Dropped into the water it quickly fills but the valve seals the bottom when the bucket is drawn up.

To empty it is but a single movement. The illustration shows the position of the bucket. At the far end of this trough is turned a lag bolt. Dropped on this the valve is forced upward and the water runs out, down the chute and into a pail waiting for it.—Dale Van Horn.

## Repairing a Noisy Tap

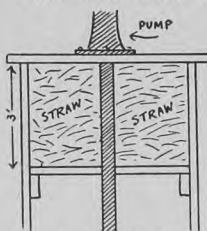
A water line, tap or pipe that chatters when the water is running slowly has a loose washer (W). If the tap drips the rubber is worn out. To repair the tap,

shut off the water line, unscrew the cap (A), unscrew the shaft (B-B) by screwing out the handle and shaft. Remove the screw (C) and take out the rubber washer (W). Rubber washers can be obtained for a few cents each. They come in three sizes, so obtain the correct size. Hard rubber and soft rubber washers are readily obtainable for hot water or cold water taps.—W. K.



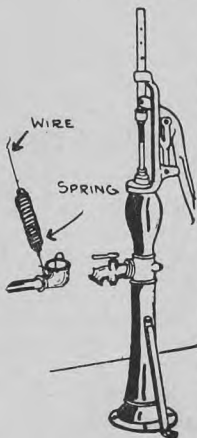
## Protection from Frost

Now that zero weather is here how many farmers try methods to protect their shallow dug wells from ice. I did it this way. I put a second cover or ceiling three feet from the top by nailing 2x4's all around on the cribbing and covering with boards and paper. Then I packed in with straw. If a pump is used a hole only large enough for the cylinder needs to be left. If you bail the water out with a bucket a second lid will have to be put on, and this could be covered with sacking. In spring the straw can be removed and a fine cool place is left for storing eggs, butter, etc.—H. C. Pinnegar, Box 103, Langdon,



## Drains Pump Pipe

Wire a heavy spring to the spout end of the pipe and fasten the other end of the spring to a crossbar of the windmill so that the pipe will be held up close to the spout, and even a little above when the spring is lifted out of the way for pumping. This gives drainage of the pipe at all times and there is no more trouble from pipe freezing up.—I.W.D.



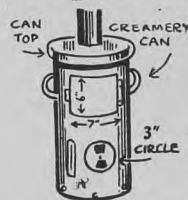
## A Drinking Fountain

Holding your hand over the spout as shown, forces water up through a hole drilled in top of the pump spout, to form a sanitary drinking fountain. A cork or plug should be provided to close the hole.



## Easily Made Heater

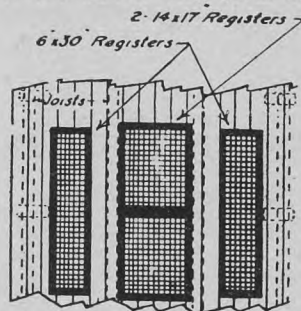
This heater will keep you warm while driving in winter. It is made from an old shotgun creamery can. Open an old stovepipe and use it to line the inside of the can so as to make it more heat-worthy. Put two inches of earth in the bottom and then put in a disc of sheet iron as a false bottom. This prevents the solder from melting off. The draft is made of half a baking powder tin. The door is made half an inch larger than the feed hole. The pipes can be made of old stovepipes, cut down to half size, or an eavestrough conductor pipe may be used.



## Cheap Pipeless Furnace

When building a home-made furnace select a section of the basement where the stove pipe can run directly into the chimney. If possible the stove should be set parallel to the joist of the floor so the registers can be easily put in place. The air ducts and 2x6 furnace frame posts can be readily placed by this type of placement.

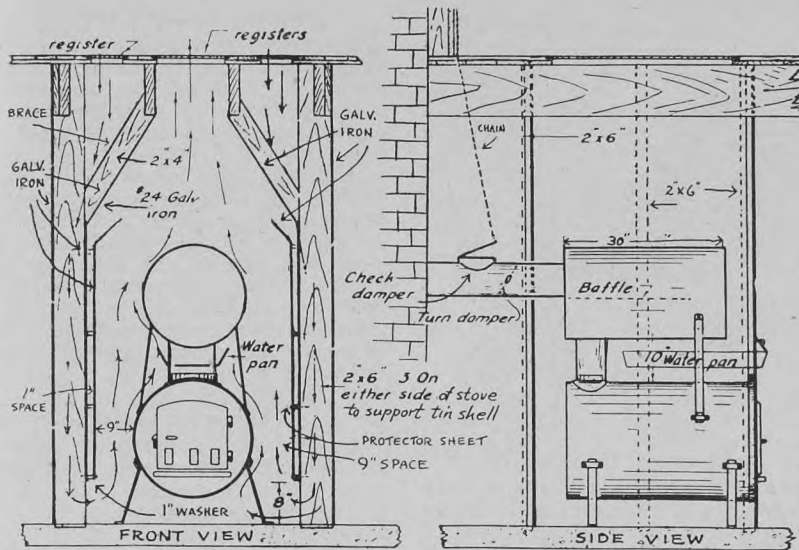
In operation, the cold air passes through the narrow cold air grates in the floor and goes down between the inner and outer shell of the furnace casing. It then travels around the stove or drum and up through the hot air grate directly above the heating unit. The circulation is rapid and the efficiency of the unit is very good. If it is



built relatively tight along the basement floor (earth or cement floor) you will find that the basement receives practically no heat from the furnace.

Construction of the furnace is very simple. Six pieces of two by six form the frame of the furnace and they are fitted to the floor or joist according to the width of stove used. The two side walls and the back are clean sheets of galvanized iron or sheet tin. At the front, the sheet of tin is fitted around the end of the stove so it can be fired. On the inside, the inner shell extends from the surface of the upper floor down to within eight inches of the basement floor. To protect the frame a protection sheet must be installed with a one-inch air space along the sides next to the heating drums. The protection sheet can readily be installed with nails and a





shell has been completed. Cheap cold air grates can be used for both the cold air and hot air floor registers.

Heating units may consist of a large box stove or one or two old gasoline or oil drums. A blacksmith will put a door and damper in an oil drum in short order. A 24x30 cottage can be heated with a single drum unit, but a second drum will greatly increase the efficiency of the heating equipment.

By placing control chains on both the few washers after the main frame and pipe damper and pipe check damper, the heat can be conveniently controlled from the main floor.

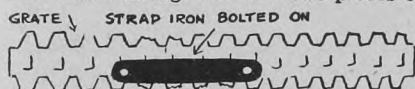
In designing and building the home-made heating unit every effort has been made to make it fire proof and yet inexpensive. With the floor register directly above the stove it can be easily observed even though it is not on the main floor. There is but one person who can protect your property from fire and that is you.—W. Kalbfleisch.

### Get the Chimney Ready

High time to be looking over the chimney and get it ready for use. Inspect it both inside and outside the attic to be sure it is firesafe. If cracked, if bricks are loose, or mortar is soft and crumbly, the chimney should be rebuilt. Clean out all soot by tying tire chains in a loose bundle to a rope and jerking it up and down so as to reach all corners. All stops and openings must be tight so as not to spoil the draft. If smoke pipes are three or four years old and a nail can be pushed through them, replace them with new ones.—I.W.D.

### Mending Broken Grates

The grates in our kitchen range became so worn in the middle that the fuel was wasting. We took two pieces of



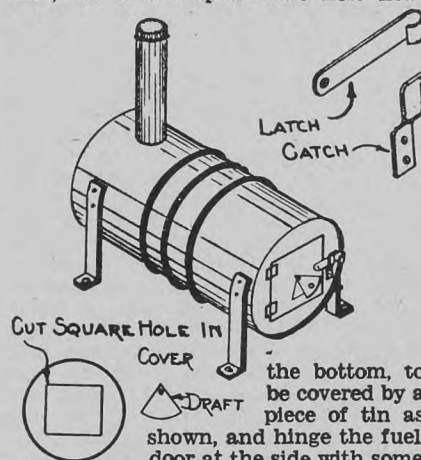
strap iron, bored holes at the ends and bolted them to good links of the grate at either end of the broken places. They

work very well and appear to be durable.—Carl A. Tatroe, Sedgewick, Alta.

### Stove From Oil Drum

FIRST cut a hole in the side of the carbide can or oil drum near the bottom for the stovepipe. Cut the hole about two inches less in diameter than the pipe to be used. After the hole has been cut, centre the pipe over it and mark around the pipe. Now cut slits from the hole out to the mark, and bend the strips between the slits up or out, and try the pipe to see that it slips snugly inside the row of bent strips. Cut slits about two inches long all around the end of the pipe, slip the pipe into place and from the inside bend the pipe strips out so the pipe cannot be pulled out. Drill a few holes through the drum and pipe strips and bolt the two together.

Cut a fuel hole about eight inches square. Cut from heavy galvanized iron a fuel door a little larger than the fuel hole, cut a V-shaped draft hole near



the bottom, to be covered by a piece of tin as shown, and hinge the fuel door at the side with some kind of a latch as shown. Now put two inches of sand or ashes in the bottom, and you have a stove that really is a heater.—I.W.D.

### Filter for Rain Water

An effective filter should be used for the cistern, especially if the water is to



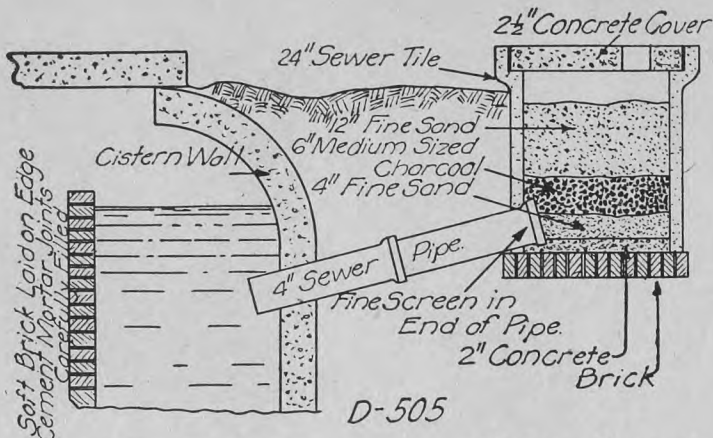
## Insist On The Plaster Wallboard that **WON'T BURN!**

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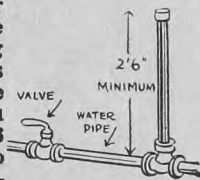
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be used for drinking or cooking. A sand and charcoal filter is effective, as it removes both coarse and fine impurities and improves the color and taste of the water. The reinforced concrete box is at least three feet square and three feet deep, and with 12 inches of charcoal. Skim off and wash the top two inches of sand occasionally, and every year or two remove sand and charcoal and wash thoroughly, or better replace with new.

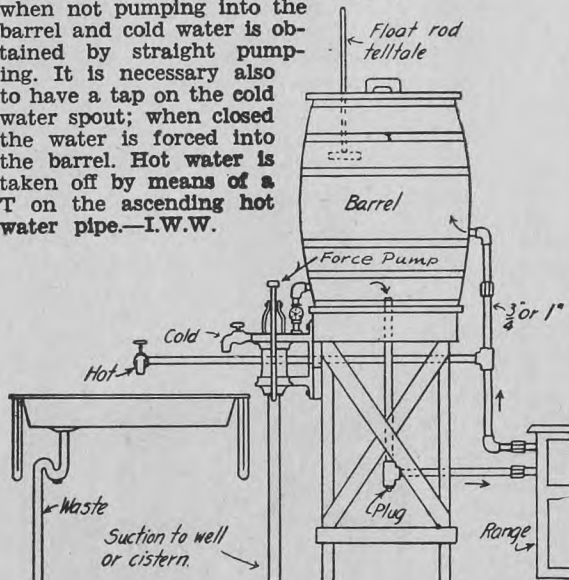
### Cure for Noisy Water Pipes

Does the cold water pipe in your home thump and bang when a faucet is closed suddenly? The figure shows how you can use a 2 foot 6 inch length of pipe to provide an "air cushion" that will eliminate this trouble.



### Cheap Water Installation

The accompanying drawing shows how this installation is made. When a barrel like this is utilized no pressure can be used. The float tells how high the water is. A tap in the connection between the pump and the barrel is closed when not pumping into the barrel and cold water is obtained by straight pumping. It is necessary also to have a tap on the cold water spout; when closed the water is forced into the barrel. Hot water is taken off by means of a T on the ascending hot water pipe.—I.W.W.

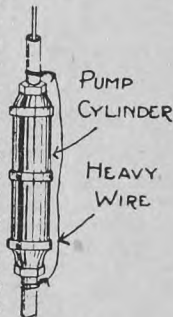


### Cleaning Chimney

Burning a double handful of dry salt on a hot fire every few days will loosen and remove ordinary soot and creosote, and will gradually crumble it when caked. The zinc and manganese in old dry cells also have a similar effect when burned on a hot fire. We do not know of any other materials which would be safe or practical to use.

### Keeps Pipe From Dropping Into Well

If you have trouble with your pump coming apart so that the pipe below the cylinder drops down into the well, where much time is required to fish it out, you can remedy the trouble by twisting a heavy wire several times around the upper end of the lower pipe, and then looping it around the drop pipe above the cylinder. It would be even better to fasten a hose clamp tightly around the lower pipe, so that there would be no possible chance for the pipe to slip through the lower wire loop. —I. W. Dickerson.



### Insulating Furnace Pipes

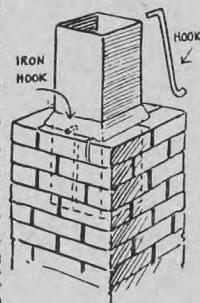
A thorough study of heat wastes in the cellar brought out some rather surprising things. For example, it was found that a great deal of "insulation" that is put on warm-air furnace pipes is actually worse than no covering at all for these pipes. Careful measurements of heat losses shows that bare, bright, clean tin pipes lost a smaller amount of heat than the same pipes did if covered with one or even two layers of thin asbestos paper. It took at least a 1/4-inch thickness of asbestos insulation to keep the heat in as well as a bright metal surface.

### Test for Faulty Chimney

A smoke test will show whether a suspected chimney is safe or not. Build a small fire with kindling and when it is blazing, throw on some pieces of tar paper or asphalt shingles. When smoke pours out of the chimney, cover the top with a board or a wet sack. If a flashlight in the attic shows smoke coming through or if smoke shows in the house around the chimney except from flue stops, you may be sure the chimney is unsafe. If very bad, it should be rebuilt. Leak into the attic can be remedied by raking out loose mortar joints and then giving it two coats of rich cement mortar.—I.W.D.

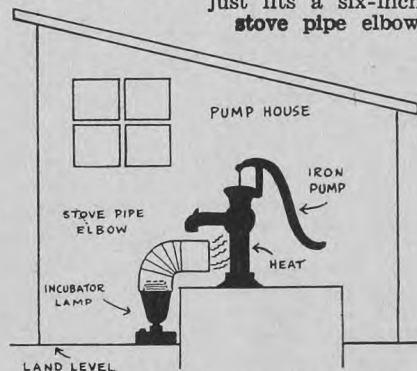
### Chimney Extension

This is about as cheap an extension as you can make to the chimney. Sometimes, when the chimney is on one side of the house, and the wind blowing over the peak toward it, the current works against the draft and the chimney does not draw well or the furnace or stove may even smoke. Often another couple of feet on the chimney will completely dispose of the difficulty. I had this trouble and ordered a flue four feet long and eight inches square. Then I took one-quarter-inch iron and made two hooks two feet long, with two inches of the top bent over at right angles. The flue simply sits on the hooks and is banked around the outside with mortar to close the joint, keep the flue straight and shed the rain. A coat of paint made from iron oxide and oil brought it out to about the right color.



### Warming the Pump

I am enclosing a sketch of a pump which is heated with a double burner Buckeye incubator lamp, with two one-inch wicks. The chimney on the lamp is six inches at the large diameter which just fits a six-inch stove pipe elbow.

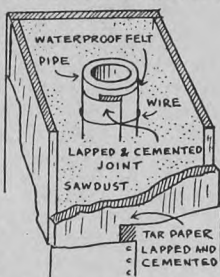


This, inside a small pump house which is insulated, will keep the pump from freezing at all times. I use just the regular iron pump with the cylinder at the top. This should help any who have trouble with their pump freezing up.



## Insulating a Water Pipe

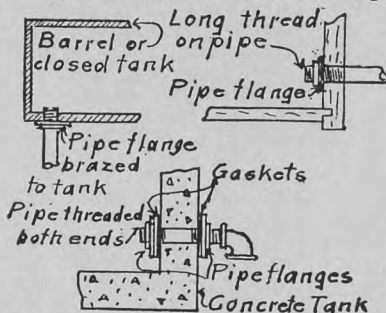
Where a water pipe goes up into a tank in the attic, hay mow, on the silo, and so on, it must be carefully insulated against freezing. The method shown is cheap and quite effective, provided the sawdust, rock wool, or other insulating material can be kept absolutely dry. Hence the need of careful waterproofing to keep out condensed moisture from the pipe and moisture from the outside air. The best way to insulate underground pipes is by putting them below frost. If this cannot be done, a good sized sewer tile should be laid and made waterproof. The water pipe should then be covered with waterproof commercial insulation, pushed into the tile, and then connected up at each end and at intermediate manholes.



down to the Prairies.—Alfred Potts, Green Court, Alberta.

## Pipe Connections to Tanks

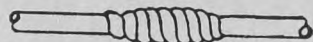
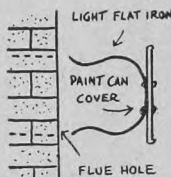
In fixing up water tanks, cistern connections, and other work about the farm, it is often necessary to connect up a pipe so as to make a watertight



joint, as shown in the diagram. About the only solid way for a steel barrel or other closed metal tank is to braze a pipe flange on the outside and then screw in the pipe. The method shown for the concrete tank can be used equally well for any type of open tank.

## Flue Hole Cover

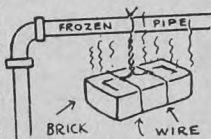
A very neat flue hole cover can be quickly made by riveting a light, flat, iron, or 22-gauge tin to a common can cover. The iron shaped as shown will securely hold the cover in place. A coat of paint matching with the surrounding wall will greatly improve the appearance.—A. S. Wurz, Rockyford, Alta.



the pipe can be replaced or a permanent repair made, and may save throwing the water system out of use at an inconvenient time.

## Thawing Frozen Pipes

For thawing out frozen water pipes in cisterns, tanks, etc., where an open flame will do no damage, a brick and wire torch serves the purpose. Take a brick, wrap the wire around it as shown and twist the wires to form a handle. Fasten to the pipe after soaking the brick with kerosene. Light the kerosene and move the brick along the pipe as it thaws.—Ernest Peterson, Chinook, Alberta.

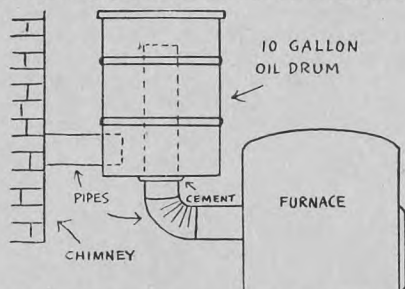


## Wood in Coal Burner

Many farmers find it convenient to burn wood in a coal burning heater in not so cold weather. Owing to the way the residue of hot ashes falls through the bottom grating it is not satisfactory. Suddenly the room is cold and the fire has to be lit all over again. This can be simply remedied by placing a loose plate on the grating leaving only about one inch all round for the ashes to fall through. Even when burning coal the plate is economical and need be taken out only when the Arctic circle moves

## Saving Chimney Heat

A lot of heat escapes up the flue when furnace pipe connections are short and



direct. A lot of it can be saved if a heat trap is made from a ten-gallon oil drum. Connect the pipe to the drum as shown. Fire cement is used to seal all connections.—A. S. Wurz, Rockyford, Alberta.

## Old Engine Pump Jack

Here is a diagram of a home-made pump jack which has been used for three years and found very satisfactory. The pump is an ordinary standard make, while the pump jack is made from an

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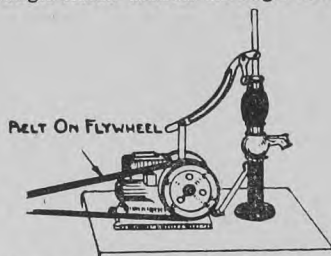
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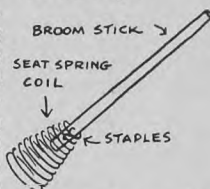
old discarded  $1\frac{1}{2}$  h.p. engine with everything stripped except the base, flywheels and crankshaft, connecting rod and grease cups. Two strap irons are bolted through holes drilled through the con-



necting rod, and to a hole drilled through the pump handle. A washing machine engine can be used for power with a V-belt pulley removed and a flat belt run on the shaft alone and around the flywheel on the pump jack.—I.W.D.

### Opener for Drain Pipe

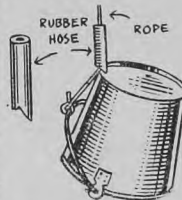
For this operation nothing serves the purpose better than an old seat spring attached to a broom stick with small wire staples. The spring is inserted into the pipe with a twisting motion. When withdrawn the sediment is



ejected without mess or bother.—Dorland A. Hotz, St. Boswells, Sask.

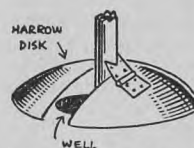
### Well Bucket Tipper

This simple device saves a lot of bother for those who use a bucket in their well. Take a piece of garden hose and shape it as shown. Then slip it on the rope above the bucket. It will keep the bucket upside down until it hits the water when a sharp jerk loosens it.—D.C.R.



### Pipe Holder

Anyone who has had pump trouble knows how hard it is to hold the pipe while making connections. All that is saved by this assembly of an old disc and an old hinge. A slot is cut in the disc to take the pipe. The hinge is welded or bolted to the disc after the other end of the hinge has been notched to grip the pipe. This can be placed on the platform and as the pipe is raised, it is held while getting a new hold on it each time.



## SECTION 12.

# Building, Carpentry, Concrete

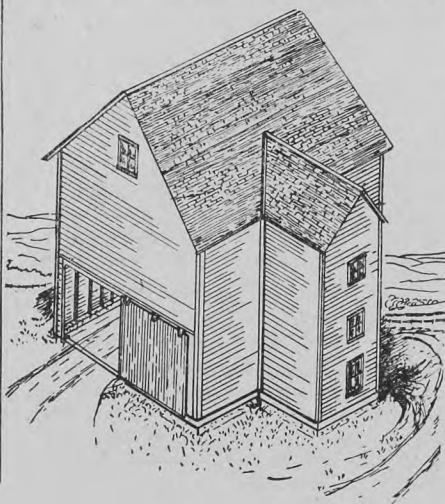
### Seed and Feed Building, Cleaning, Grinding, Storage

This building was designed by the Dominion Experimental Station, Swift Current, Saskatchewan. It is intended mainly for large farms, seed growers, co-operative farming projects, or as a municipal enterprise. It is not intended that a building be constructed as shown in the sketch but rather to be used as a suggestion for formulating plans that will more closely meet local require-

ments. Some of the features can be incorporated in a smaller seed and feed building for smaller farms.

The principal features of the plans shown here are as follows:

1. A sheltered driveway for unloading or loading.
2. A basement and stairway to permit ready access to hoppers and elevator boot for thorough cleaning purposes.
3. Deep, narrow storage bins to make best use of movement by gravity.
4. Seed bins lined with light gauge sheet metal to prevent mixing of varieties.
5. Facilities for grinding feed grain with maximum utilization of gravity to avoid excessive equipment and handling.
6. Grain elevator to convey grain into any bin in the building.
7. Unloading bins directly over the driveway for quick and easy loading into trucks and wagons.
8. A space in the driveway for installing weight scales (if such are required). An alternative would be to build an unload hopper on a scale on the unload bin floor just above the driveway.
9. Seed cleaning and grading machines located in the floor above the bins. This floor is constructed with 1-inch fir flooring on shiplap with heavy paper tween to ensure no mixing of varieties in bins below the floor.
10. A gas engine room on the ground floor. If one large electric motor is used, this may be installed on the seed clean-



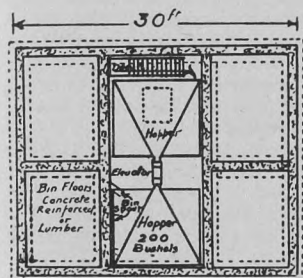
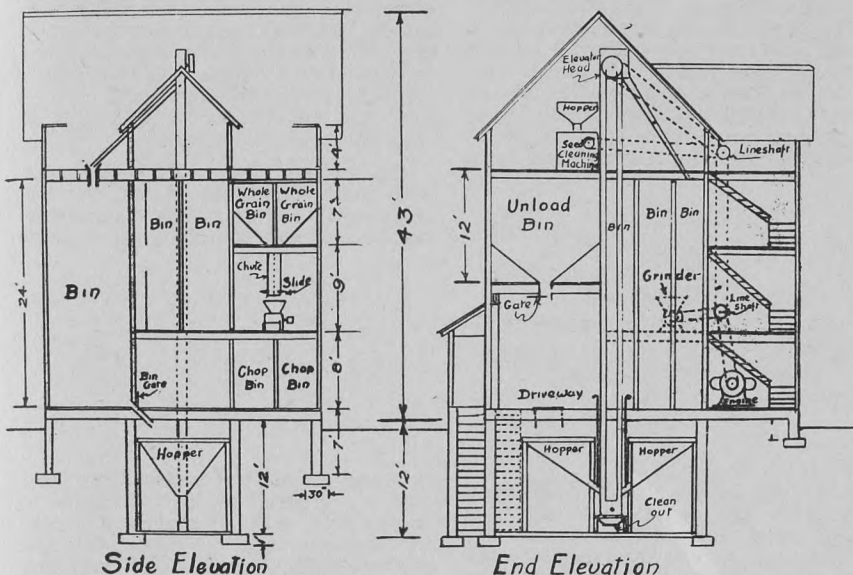


ing machine floor with suitable line shafting. However, a direct electric motor drive for each machine and elevators is the modern and most satisfactory method of providing power for stationary equipment.

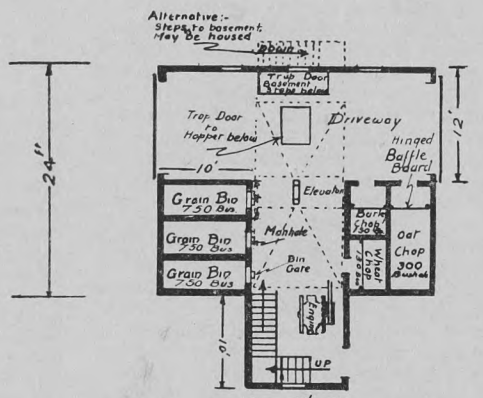
11. A stairway provided for quick and

safe access to any floor and machines.

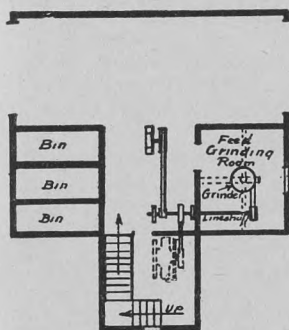
When planning a large seed building, it is wise to have the plans drawn up by a good architect familiar with the type of such buildings. Also consult a local carpenter or contractor who may erect the structure.



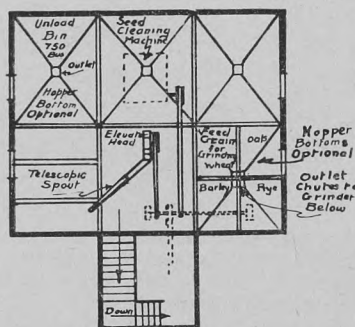
Elevator boot and two hoppers in basement



Driveway-loading & unloading-Engine room



Lineshaft-Grinder with chop  
Bins below, whole grain bins above



Elevator head, Grain distribution to bins  
Seed Cleaning & Treating Equipment



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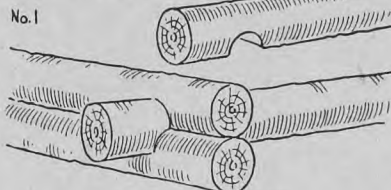
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## Building With Logs

So many requests have come to The Guide for information on the construction of log houses and other buildings that we reproduce herewith instructions written for The Nor'-West Farmer some years ago by V. W. Horwood, well known authority on farm home construction.

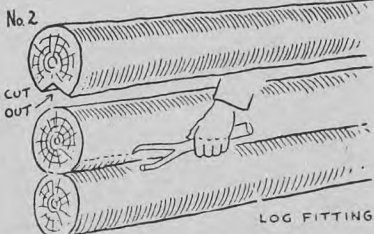
The first thing to do after the site is picked is to get a corner. To lay the building square use the simple rule known as the 3, 4, 5 rule and by using a common multiple it can be increased to any length, say by 2—gives 6, 8, 10. At one corner of your building set a

END LOG CONSTRUCTION



mason's square and stretch a line each way from the corner, following the square sides; then on one line measure off three feet and on the other measure four feet; adjust the two points so measured that the distance between them will measure exactly five feet.

In fig. 3, the notching of floor beams into sills is shown, floor beams being at two-foot centres. These beams are hewn on top. The construction of a notched log wall is shown in fig. 1. The construction is as follows: The first log is in place. The log above should be marked for the cut on its under side to fit over the log below. On long logs six-inch nails or pins should be driven in to prevent the log from springing—and if the log is not straight, a cut from a crosscut saw will allow it to be sprung into position. In laying the logs the butt end of one should be laid alternate to the small end of the other, so that the logs will be kept level. Often the doors and window frames are put in place and the logs spiked to the frames. An-

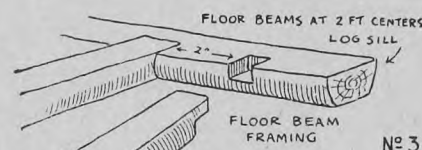


other way is when heights of doors and windows are reached to make two saw cuts in the logs at the proper width to give a starter for sawing.

The trouble in log wall construction, unless the logs are squared, is to get the upper logs to fit snugly over the under log. There is a gap to be filled with plaster or moss—a poor construc-

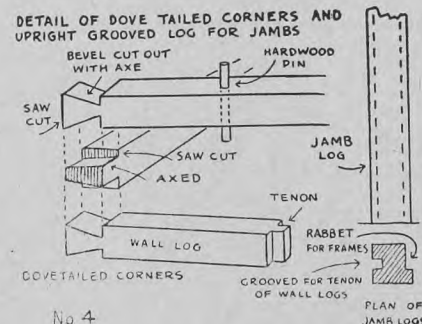
tion. In fig. 2, is a method which gives a snug joint. When the log is notched approximately to its position lay it on the wall. A wide crack will be between the two. Take a piece of wood about the size of the crack with a pencil on top. With the piece of wood follow the top side edge of the under log on both sides. The pencil will mark the irregularities of the under log on the top one. A scribing tool like the one shown can be purchased or made. Cut to this line, adjust the log; cut out until it rests snugly over the upper log. Put moss on, making an air-tight joint.

Fig. 4 shows dove-tailed construction with jamb logs rabbeted and the logs tenoned into them. This construction can be used on a round log construction



by using the method in fig. 2. The jamb logs are grooved about 3x3 inches by boring holes with an auger and chiseling between to take out rabbet. Into this the wall log is tenoned. Erect these logs. Measure for the length of wall log and lay on the wall; on this measure for depth of jamb rabbet. Saw this piece out; put tenon into rabbet, then go to corners and mark the length and where the corners fit into under piece, saw and bevel to make dove tail. Fit this log into place. If your log is square it will rest on the lower log. If round you will use the method shown in fig. 2. Bore holes through log when in place and drive hardwood pins to hold logs. The construction of the roof with poles for rafters would be carried out by notching as in fig. 1.

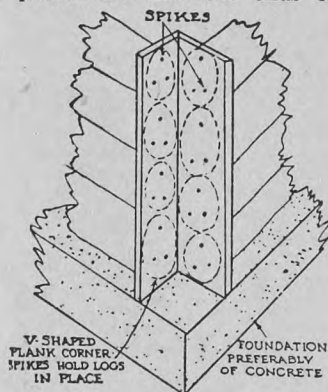
The Hudson Bay log house is another type which is more easily and quickly put up. Spike together two two-inch planks, one as wide as the diameter of the logs to be used, the other two inches wider, the planks as long as the building is to be in height from foundation to plate. Set up a pair at each corner with



the point of the "V" placed so as to be exactly where the inside of the corner of the building is to be. Cut logs in exact



lengths, place between the upright corners and spike through the planks into the log ends. Set up plank frames for door and window openings and spike firmly to the ends of the logs. For plate use a log or pole about four feet longer than the length of the building to provide for a two-foot projection at each end. Use poles for rafters. Spike a plank securely to each of the four rafters that are to hold up the gable ends. Cut end logs the proper slant and hold them in place by spiking through the plank and into the ends of the



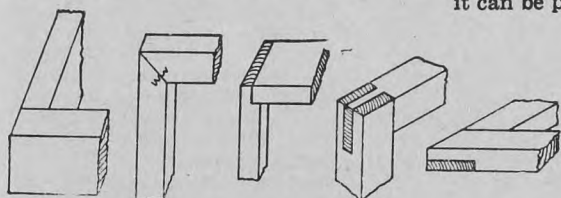
gable end logs. Roof with sheathing, shingles, or ready roofing. Floor to suit requirements. If concrete is not used for foundation, a log will serve, but concrete is best. Five or six-inch spikes are used to secure the corners. To finish off the corner, an upright log fitted into the "V" gives a better appearance but doesn't add anything to the strength of the corner. Buildings of this construction will stand for years.

The simplest type of log building is the one made of small logs or good sized poles and with notched corners. There is no trouble putting up a building of this construction except to see that the notches fit fairly snugly over the log they contact with and that the logs are laid with the notch down instead of up, this to shed rain and keep the corner from rotting. No foundation other than logs or blocks is used as a rule for buildings of this type.

For plastering a log wall use one part each of lime and sand, or one of cement to two of sand. To keep the mortar in position drive small nails into the logs at four-inch centres and staggered. Another method of keeping mortar from sliding off a log is to nail small strips, often willow limbs, on the logs just under where they meet.

### Various Wood Joints

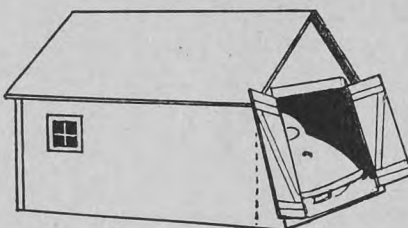
Here are some of the simpler corner joints that can be made in working



wood. The first is the simple butt joint. It is held together by nails or screws. The chief consideration is to have the connecting surfaces cut true and square. In the mitre joint the stuff is cut at 45 degrees and a mitre box should be used. Corrugated fasteners can be used. The rabbet joint has the advantage that it can be nailed from both directions. The dado joint is similar to the rabbet joint but is some distance from the end, as in making book shelves and step ladders. Crosslap joints are used in making sash or window screen frames. They are held together by small metal pegs in the case of window sash and by clinched clout nails in the case of window screen frames.

### Lengthening Garage

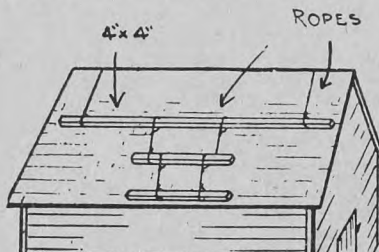
Here is a simple way to lengthen the garage so that it will take a longer car.



Just extend it out at the bottom, without lengthening the roof. The doors will stay either open or shut and they also lift clear of the snow. The drawing was made from a snapshot taken on the farm of John Stevens, Morrinville, Alta.

### Shingling Scaffold

The sketch shows the safe and convenient scaffold for shingling the roof on a building. For the main scaffold, use a 4x4 tied to ropes which run over the peak and are tied on the other side



of the building. This is large and long enough to hold a large supply of shingles. Scaffolds lower down can be tied to the main one for starting the roof. When the main scaffold is reached, it can be pulled up as the shingling proceeds.

After seeing an old friend fall and almost impale himself on a post, due to the splitting of a cleat nailed to the shingles, I recommend this as a simple and thoroughly safe scaffold to use.



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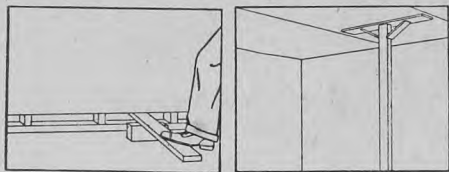
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## Building with Stoneboard

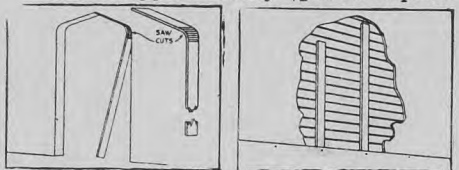
Here are some helps in putting on Stoneboard or other kinds of wallboard. In using the sidewall helper, butt lower board tightly against the upper one, using the lever helper shown, so baseboard covers any open space. Span bot-



tom of window openings. Maintain at least one-inch space between board and basement floors.

Over cracked plaster, rout out loose plaster down to wood lath. Apply furring strips 16 inches o.c., flush with old plaster surface. Nail through old surface to wood studs or joists.

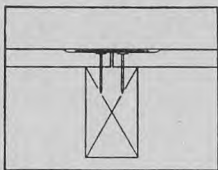
Forming arches, face boards are cut with a saw and sanded. Soffits are curved by scoring back paper at intervals of approximately 1/2-inch depend-



ing on radius. Then nail to curved contour and sand edges.

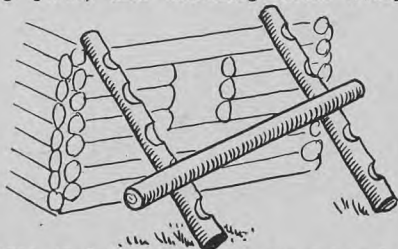
A Ceiling "Helper"—Apply ceiling boards first using the handy "T" helper shown. Over cracked plaster ceilings, furring strips may be used. Start nailing at centre of the board and work towards ends.

The edge of this board provides a channel for applying the tape cement. It assures a level surface without "feather edging" over a wide area and provides for perfect concealment of the tape.



## Raising Log Building

A man on a farm who wishes to build a log structure and is short of help, can get along mighty well alone by taking log poles, and notching them every



three or four feet, as shown. Then he sets one up at each corner of the building and slides the logs up them, one end at a time. This is a still greater help when nearing the top of the wall. The skids can be made 30 or more feet long.

## How to Frame a Frame House

The illustrations, figs. 1, 2 and 3, show cross sections of the wall of a two-storey house and fig. 4 shows a cross section of the roof and wall where they join a one and a half storey house.

Beginning at the bottom, fig. 3, note that the wall plate is imbedded in the concrete and is flush with the outside. The bottom plate, to which the studding is nailed, is directly above it. This brings the sheeting and siding outside the perpendicular line formed by the outside of the basement wall and the outer edge of the studding. The mud sill, which should be at least 6x8 inches or better still 8x8 inches, is not shown in the drawings. It carries the inside ends of the ground floor joists and its ends are imbedded in the basement wall while it is supported inside the basement by one or more posts. A vital point regarding these posts is that the concrete basement floor should not be brought up around them. If it is they will rot and disastrous settling will result. They should be on a concrete base which is built up four inches above the level of the basement floor.

After the joists are in position put on the rough flooring. All the bottom plates, both of walls and partitions, are placed on top of the rough floor. The outside finish at this point is a thickness of sheeting, preferably shiplap, a base board and drip cap and above that the siding. Two thicknesses of building paper, the inner one white and the outer one tar paper, are placed under the siding. Where the framework sits on the basement wall both outside sheeting and base board with the paper between, are brought down well below the wall plate. With the beam filling added you have a warm, windproof job.

The inner finish shows a thickness of shiplap siding on the studding. It is covered with two thicknesses of white building paper, then strapped and lathed and plastered. Instead of building paper on the sheeting, felt or sheet insulation can be used. The wall between the studding may be filled with shavings, moss or other bulk insulation material.

At fig. 2, is shown the wall at the first floor ceiling. A 1x4-inch ribbon is let into the studding to support the joists. The gains are made in the studding before they are put in place.

Fig. 1 shows the construction where the roof rests on the wall. The ceiling

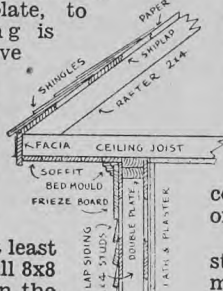


Fig. 1

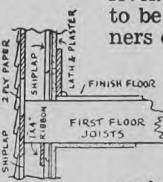


Fig. 2

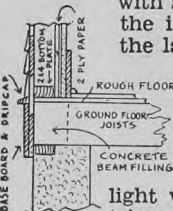


Fig. 3

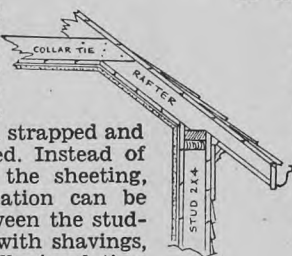


Fig. 4

joists are carried out the width of the eave to support the rafters. The frieze board is nailed in place and the siding finishes up to it. The soffit may be plain board or V-joint. The fascia is nailed on the end of the ceiling joist. It takes the eave-trough and projects down about 3/4-inch below the soffit. A layer of white building paper,

covered with a layer of tar paper goes on beneath the shingles.

Fig. 4 shows the construction of a storey-and-a-half house where the roof meets the walls. The collar ties are 2x4 inches and are nailed to the rafters. The soffit is on the angle of the roof though outlooks may be nailed in and the soffit put on the level. If it is, returns have to be worked in at the corners of the building.

For the upstairs ceiling two types of insulation are available. If bulk insulation is used all that is necessary is to lath as in fig. 1, directly on the joist or rafters, between which the insulation is placed. If blanket or sheet insulation is preferred, the construction is as in fig. 4 with strapping used to hold the insulation and to take the lath.

Fig. 5 shows how an opening for a window is framed. If the opening is for a door the trimming is the same except that the side studs come down to the floor. Where two-light windows are used the opening is trimmed seven inches wider in the clear than the width of the glass to allow for the sash, the window frame and some play for plumbing the frame. The depth of the openings are the depth of the two panes of glass plus nine inches to allow for the sash and the top and sill of the window frame. The trimmed opening is of double 2x4's all round to give wood for nailing the finish to. In cutting the studs additional allowance of 3 1/2 inches has to be made for the top and bottom trimmers. From where the bottom cut is made to the top of the finished stool is about seven inches.

When trimming an opening for an outside door leave it four inches more in height and about three inches greater in width than the dimensions of the door. In addition 3 1/2 inches must be allowed when cutting for the height, to allow for the double trimmer.

Fig. 6 shows a cross-section of a two-light window. It includes the outside

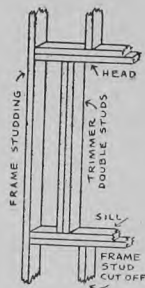


Fig. 5

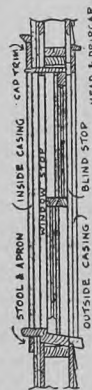


Fig. 6



and inside finish. The details of the construction of a window frame are shown in fig. 7. The inside of the frame is four inches wider than the glass. The head, and the sill at the shoulder, are cut  $\frac{3}{4}$ -inch longer than this as each end is let into the side  $\frac{3}{8}$  inch. The sill is given sufficient pitch to drain the water off. The depth, inside measurement, is six inches more than the depth of the two glass panes.

In fig. 7 the detail is shown. Imagine one side of the assembled frame to be sawn through after being nailed in position and that you are looking down on the cross-section, which is shown in the middle of the cut. The 2x4 is the studding in the wall, which is usually double. The frame is held in position by being nailed to the studding through the blind stop. The top sash fits between the blind stop and the parting stop and the lower sash slides between the parting stop and the window stop. Outside the blind stop the outside casing is shown. The side jamb projects in past the studding far enough to allow for the sheeting, strapping and lath and plaster. The plaster, therefore finishes flush with the frame so that the inside casing lies flat with the plaster.

The cellar frame is the easiest of the outside frames to make. The details are shown in fig. 8. The amateur carpenter had better take his measurements direct from the sash. Be sure that the sides fit in between the head and sill so that the frame will stand up under the weight that may be put on it by the building above. It is rabbetted as shown to take the sash on the inside and the storm sash or screen on the outside.

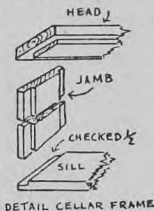


Fig. 8

## How To Frame a Roof

Before undertaking to frame a roof, make a fence for your steel square. Take a piece from a common board two inches wide and three feet long. Run a gauge line down the middle of the edges and with your rip saw run a kerf down from each end, leaving about 10 inches of solid wood in the middle of the fence. The blade of the square is inserted in one kerf and the tongue in the other. Small screws inserted in the fence will clamp it securely to the square.

Fig. 1. Framing a rafter with fence on square



Fig. 1 shows how the fence is attached to the steel square and illustrates also

how the square is applied to the rafter in getting perpendicular and horizontal cuts. The tongue of the square is on the left and the heel cut, when the rafter is in position, is exactly up and down. On the right is the blade of the square, shown as it is applied in making the plate cut, that is the part of the rafter which rests on the level plate of the building.

When you start to frame your roof, first pick out a straight scantling to make a pattern rafter. Be sure you have it framed right and then mark all the other common rafters from it. Draw a line down the middle of the dressed side. In framing the rafter always work from this line.

Here is a handy thing to know in getting the middle of a board or scantling that has an odd width. Put your square and rule on it at an angle, until you get a measurement that can be easily divided in two. The scantling will be about  $3\frac{3}{4}$  inches in width. Angle your ruler on the face with the end of the rule at one edge and the four-inch mark at the other. Then tick off a point at the two-inch mark and there you have the exact middle, haven't you?

The pitch of the roof is important. Houses are usually framed with half-pitch roofs.

In this case the rise or the height of the peak above the level of the plates is one-half the width of the building. In carpenter's language, the rise is the same as the run.

In getting the cuts the 12-inch mark is used on both the tongue and blade of the square. A common pitch used on small buildings is the one-third pitch. Both pitches are shown in fig. 2. In this case the rise is eight inches for each foot of run; the eight-inch mark is used on the tongue, still using the 12-inch mark on the blade. The tongue gives the upright cuts and the blade the horizontal ones.

Since we are dealing with house roofs we will assume that the half-pitch is used. Adjust the fence on the square so that the 12-inch marks on both blade and tongue come exactly on the centre line you have marked. First mark the heel cut, as shown also in fig. 1. If the projection of the roof is one foot, then

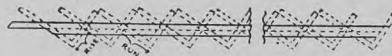


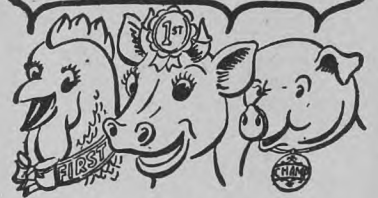
Fig. 3. Measuring a rafter by the step method.

the plate cut can also be marked. It is from the centre line to the bottom edge of the rafter.

Now make the heel cut and then rip the scantling on the centre line until you come to the mark for the plate cut. Then make the plate cut. It is always best to do the ripping first, since there is less danger, when making the other

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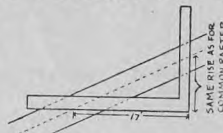
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cut, of sawing in past the centre line and weakening the rafter. The lower end of the rafter is now framed.

To get the length of the rafter apply the fence to the upper edge of the scantling and step it off as shown in fig. 3. First place the 12-inch mark on the blade of the square at the intersection of the plate cut and the rip cut. Tick off the point where the 12-inch mark on the tongue lies on the centre line. You will note that this gives you one foot of run and one foot of rise. Move the square up until the 12-inch mark on the blade is on the point you have ticked off and again mark as before. The square is applied as many times as half the width of the building in feet and the ridge cut is along the tongue of the square at the last application. If a ridge board is to be inserted between the rafters cut back five-eighths of an inch to allow for it.

You now have your pattern. The other rafters are marked from it. When a pair has been framed it is best for the amateur to put them up in place and see that all the cuts are right. Be sure you are right, then go ahead, is a good motto. It is best to put the heel cuts on the four end rafters only. Then after all the rafters are in place stretch a chalk line, mark to it and then cut off the ends. This ensures a straight edge to the roof.

Fig. 4. Getting the cuts for hip or valley rafters.



If the cornice is not on the slope, but on the level, the detail may be as shown in fig. 1, How to Frame a Frame House, on page 132. In this case the roof is framed as if the body of the house extended out as far as the end of the ceiling joist.

### Cutting a Hip Rafter

To get the cuts on a hip rafter, take the same rise on the tongue of the square as for the common rafter, but instead of 12 take 17 on the blade as shown in fig. 4. Frame the bottom after the rafter is up when the proper place to make the cuts can be found by carrying out the lines from the heels of the common rafters by means of a straight edge.

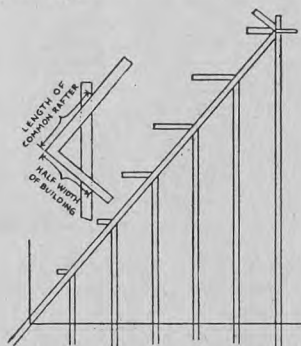


Fig. 5. Hip and jacks in position. Insert shows how to get backing for hips.

To get the length of the hip rafter step it off as you did the common rafter

using the same number of steps. To get the bevel cut to fit against the common rafter take the length of the common rafter on the tongue and the length of the hip on the blade. Blade gives cut.

To get the backing of the jack rafter to fit against the hip rafter take half the width of the building on the tongue and the length of the common rafter on the blade. Blade gives cut. The novice can get these cuts by putting the rafter in place and marking by the hip. For the vertical cut at the top and the plate cut at the bottom the same bevels are used for jacks as for common rafters. To get the length of the longest jack rafter measure across from the last common rafter to the hip so that the two will be the proper distance apart and mark. Place the steel square on the common rafter and mark it directly opposite the mark you have just put on the hip. There you have the length of the longest jack.

Always nail the jack rafters on in pairs to avoid putting the hip out of line. The cuts and lengths for valley rafters and valley jacks are got in the same way as hips and hip jacks.

Precautions must be taken to have valley and hip rafters in line with the rest of the roof. Hips are placed so that the upper corners are exactly level with the other rafters. With valleys the middle of the upper edge is in line with the common rafters.

### Estimating Materials

It takes about 7½ shingles, laid five inches to the weather, to cover a square foot. This will allow for waste. Where the roof is cut, broken or hipped, more will be taken. For lath and plaster, each 100 square yards, take the following: 1,450 laths; for the brown coat, 900 to 1,000 pounds of No. 1 hardwall and 1¼ yards of sand; or, 400 to 1,700 pounds of fibre plaster and ¾ yard of sand. The finishing requires 100 pounds of finish and 275 pounds of hydrated lime.

A four-inch wall takes 6½ bricks for each square foot and a double brick wall, 13 bricks. To lay 1,000 bricks will take 300 pounds of hydrated lime and ⅝ yard of sand. A chimney with a flue 8½ inches square will take 30 bricks per foot in height. With a flue 8½ by 13 it will take 35 bricks.

For 100 yards of woodwork two coats of paint will take four gallons of ready mixed paint, one gallon of linseed oil and a pint of turpentine. For each additional coat of paint allow 2½ gallons.

For framing lumber allow 20 pounds of four-inch spikes and five pounds of 2½-inch common nails. Sheeting and shiplap take 20 pounds of common nails per 1,000 feet and siding 20 pounds of siding nails. For shingling allow 3½ pounds of nails per 1,000 and for laths seven pounds per 1,000.

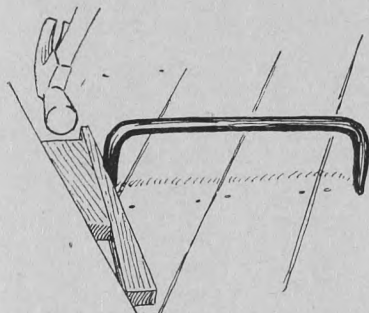
And here is a table for estimating materials for concrete:

Mixture	Cement Cu. Ft.	Sand Cu. Ft.	Gravel Cu. Ft.
1. 1½. 3.	7	10½	21
1. 2. 3.	6½	12½	20
1. 2. 4.	5½	11	22
1. 2½. 5.	4½	11½	22½
1. 3. 6.	3½	11½	22½



### Taming Refractory Flooring

This enclosure outlines an idea that may possibly be useful to someone, who, like myself, occasionally comes up against the problem of trying to persuade serpentine pieces of flooring to come within bounds by the aid of nothing more potent than a wood-chisel and some compound cuss-words.



Being the sort of bird that likes to monkey around in a workshop himself, I never cease to marvel at some of the "inventions" produced from odds and ends picked up in the farm "boneyard," and which find their way to the farm workshop.—The boys are good!—R. S. MacNeill, Shelby, B.C.

### How To Finish a House

In finishing a house the first thing to do is to fit the windows and outside doors to get the building enclosed. To fit a window, first trim the top sash so that it will fit closely against the blind stop. For details see figs. 6 and 7, in *How to Frame a House*. Remove sash and put in the top parting bead, cutting it long enough so that it will fit into the grooves at the side. Cut the side beads to fit the slope of the sill and fit them under the top bead. Replace the sash, dropping it to the sill, and mark the distance the bead comes out on the parting rail. Cut the sash to suit, replace it resting on the sill, slip in the side beads, raise the sash to position and fasten there with small cleats between the beads and the blind stop.

Trim lower sash the proper width, place against the beads, around which it is fitted. With a pair of dividers find the distance that the sash must be dropped to bring the tops of the parting rails flush on top. Scribe along the sill on the outside, rip off the excess wood at the bevel of the sill and fit to the sill with a smoothing plane. The sash is then held

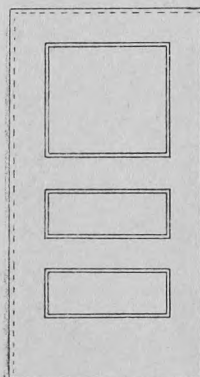
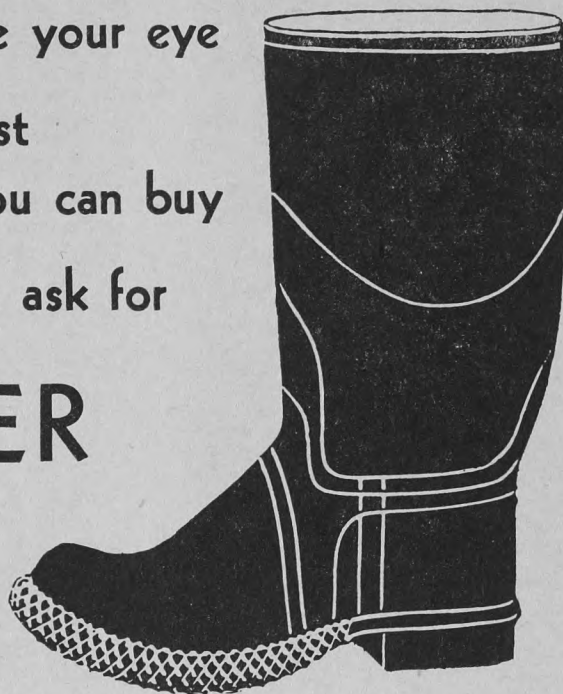


Fig. 1

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in place with the window stop.

The window stool is then cut to fit against the bottom sash and is long enough to take the side trim and allow an additional 1½ inches to work a return at each end. The trim is then put on around the opening, last of all the apron, under the sill.

To fit a door, straighten the hinge side to fit the frame (fig. 1). Then scribe the top and other side. Inside doors swing half an inch free from the floor. Outside doors must be fitted to close just clear of the sill.

To hang a door, wedge into position tightly against the hinge jamb. With a half-inch chisel mark off the door and jamb 11 inches from the floor and six inches from the top. Use a hinge gauge to mark the distance the hinge is kept back from the side of the door and the corner of the rabbeting. You will thereby avoid hinge binding. Let the hinges into the wood the

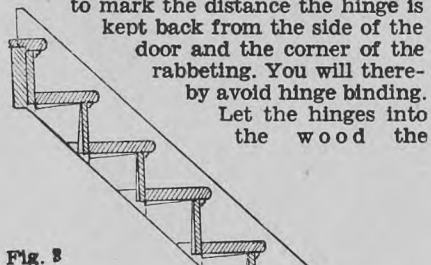


Fig. 3

depth of the metal, with the bottom hinge above the lower chisel mark and the top hinge below the top one. Some adjustment is almost sure to be required to get the door to swing properly.

Locks are placed about 3 feet 2 inches from the floor. First make the mortise so that the body of the lock will fit into it snugly. The rest of the work is a matter of fitting.

In putting on

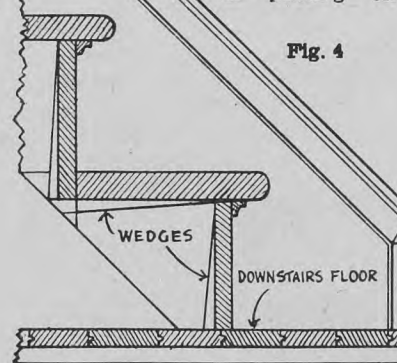


Fig. 4

the base, start with the longest span of wall and work in each direction toward the door. Fig. 2 illustrates how base with a moulding is coped at the corners of the room. Cut the piece to be fitted, as shown in the unshaded part, at an angle of 45 degrees, using a mitre box. Cut away with a coping saw to the intersection line and if the piece shown

as shaded is plumb, the other will fit against it neatly at every point. This principle applies with any pattern of moulding.

To build a stair properly calls for special skill and is best done by an experienced carpenter. The rise is the distance from the top of one step to the top of the next. The run is the distance from the face of one riser to the face of the next one to it. The step is wider than this as there is a projection. A general rule regarding the proportions

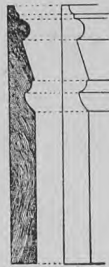


Fig. 2

of the rise and run is that the two together should total about 16 inches. Fig. 3 shows a stair

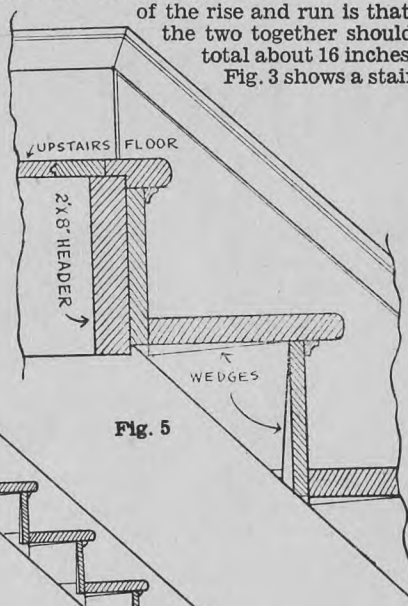


Fig. 5

string, fig. 4 the enlarged scale and fig. 5 the detail at the top, also enlarged. The shaded parts show the treads, risers, etc.

The first thing to ascertain is the exact height between the top of the finished downstairs floor and the top the upstairs floor. It is better done with a piece of say 1x2. Supposing it is 9 feet or 108 inches; if 15 risers are used this will work out to about 7¼ inches to the riser. Set a compass to this and keep adjusting it until you come out exactly to 15. Take a piece of board about half an inch thick

or less and cut it into a triangular shape, with one side equal to the rise and the other equal to the run. After straightening the top edge of the string do some experimenting and find out exactly the point where the face of the riser, extended upward, intersects the top of the tread. Since this point will be the same distance from the top of the string

for each riser and tread, a line can be drawn the whole length of the string through this point. Then invert the pitchboard with the long side on the line and lay out the steps.

Now make two templates the exact size of the housings, one of the tread housing and the other of the riser housing, including the wedges in each case. The housing is at least half an inch deep and for the nosing it is made by boring a hole that depth with a bit which is the same thickness as the tread.

Always bore the nosing holes first and then do the sawing for the housing. In building the stair, wedge the risers and treads as shown after giving the wedges a generous coat of glue. Note, fig. 4, that the bottom riser differs in width from the others because it does not have to lap over the back of a tread at the bottom.

## How To Frame a Barn

The weight of a barn should be taken by concrete or masonry. When concrete walls are used for a low foundation it should be two or three feet above the ground level. Bolts are inserted every six or eight feet to hold the sills (fig. 1). The wall is allowed to set well before putting the weight of the superstructure on it.

For sills select straight 2x6s. Beginning at one corner place one length of the sill on top of the bolt shanks, taking care that it is exactly above the position it will finally occupy. Hit it a smart blow with the hammer over the first bolt. This will give you the mark by which to bore the first hole. Bore it and replace. The bolt will catch in the hole if one man holds the scantling down a little. Use a short straight edge to keep the edge of the sill plumb over the side of the wall while the marking is being done. Mark, bore and replace. Continue until the sills are all fitted. Then make a batch of thin cement and sand to bed the



Fig. 1

sills. If properly done the sills will be level both lengthwise and crosswise.

The posts that support the girders stand on concrete abutments going down below the stable floor and having a good large bearing surface to take the weight. In cutting them make allowance for the depth of the girder and a corbel, if one is used. Place them in proper position and brace them perfectly plumb. On top of them place the corbels, if any, and on that build the girder, after lining them true with a chalk line.

Previous to this the studs will have been framed. In the plan, fig. 6, they are 14 feet high. They are squared at both ends and the only framing that is required is a housing in each to take the ribbing piece which

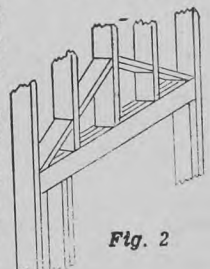


Fig. 2



supports the joist. The ribbing should be 1x6 and of sound material. The top is one inch lower than the top of the girder to allow for crown.

In laying out the sills for the studs, make sure to work from the same end of the building so that the studs will be exactly opposite. Also see that the

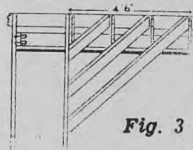


Fig. 3

the ribbing pieces from them so that the studding will be plumb.

Now you are ready to begin raising. The corner is built up of two 2x6s kept two inches apart by bits of 2x4. These are erected and braced to the inside of the sills. The next stud takes the other end of the first ribbing piece. A couple of joists can then be put up to tie these studs to the girder, with the outside ends resting on the ribbing and flush with the outside of the walls. The toenails into the girder will have to be drawn later and the heads are left out far enough to allow this to be done, not forgetting how hard it can blow in this country. Brace everything firmly, and proceed until all the side studding are in position.

The end sills and joists are then laid out to take the end studding, which are next nailed in place.



Fig. 4

Lay out the openings for doors and windows in the stable. Fig. 2 shows how to frame a wide opening so as to prevent sagging. For nine-light stock sash with panes 9x12 the opening will be 2 feet 11 inches wide and 3 feet 10 inches high in the clear. Carry up the shiplap on the outside to the top of the joist and then straighten the walls by sighting along the top of the shiplap. With the joists all in position spike them together over the girders and toe-nail to the girders, being sure that the building is firmly tied together to prevent spreading. Fig. 4 shows how the joists are bridged to give further strength. The top plates can then be put on and the shiplap carried up to them.

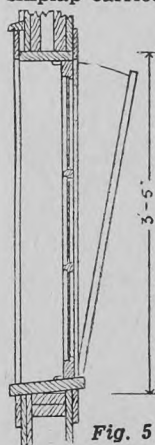
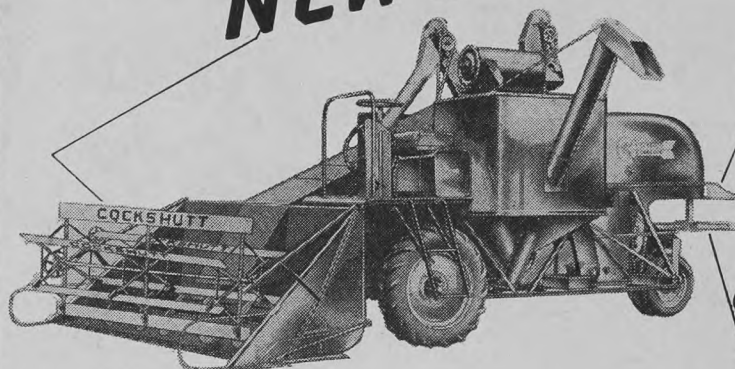


Fig. 5

Before framing the roof lay the floor of the mow. Then clear a big stretch of this floor to lay out your rafters on. Select two studs, which are exactly opposite, and strike a chalk line between them. Get the exact middle of the building and strike another chalk line up it using the first chalk line as a base. Then on each side of this centre line, and 7 feet 6 inches from the outside of the frame strike a line parallel to the centre line. Select two straight 14-foot 2x8s and two 12-foot 2x6s as rafter patterns. For the amateur it is a cut and fit proposition. Study the

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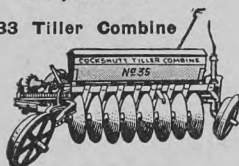
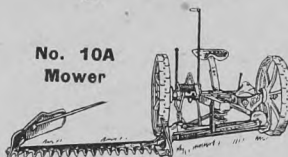
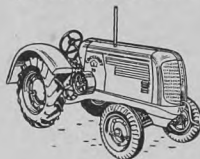
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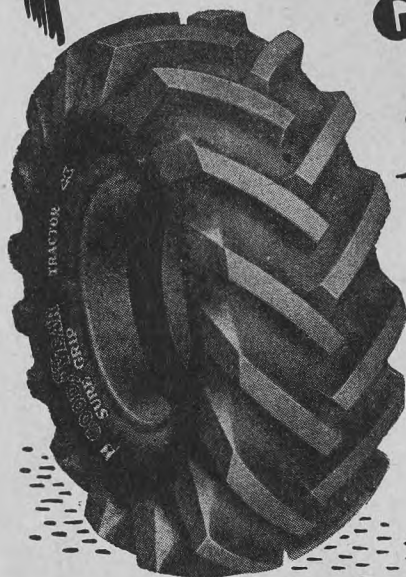
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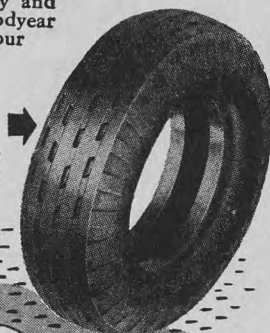


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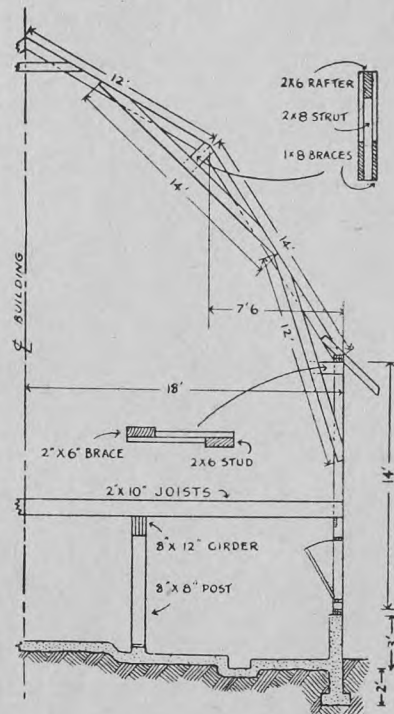
# GOODYEAR

THE GREATEST NAME IN RUBBER

framing of the roof in fig. 6 carefully. The measurements are all there. Those rafters, braces and struts, as assembled in position, can be laid out on the floor. It is just a case of using your ingenuity and every single cut and length can be figured out. The heels of the rafters are scribed to fit the sides of the studs. Where the hip comes the proper cut can be found by placing the end of one rafter over the end of the other one, ticking off where the two edges of the scantlings intersect, and drawing lines for the cuts by connecting the points ticked off. The cut at the top of the rafter is along the centre line that has been chalked off. Make a good set of patterns for one side of the roof. Be sure, and doubly sure, that everything is exactly right and if they fit together on the lines you have drawn on the floor they have got to be right when they are standing in position.

Fig. 3 shows the projection of the frame to carry the hay sling track. The top piece had better be a piece of strong 2x6, framed back into the roof of the barn. The lower piece is also 2x6 fastened to the collar tie by iron brackets and hung from the ridge in iron stirrups and stayed to the outlook rafter by iron rods to keep it in line. It is a wise precaution to tie the top of the walls to the joist by pieces of 1x6 to prevent spreading.

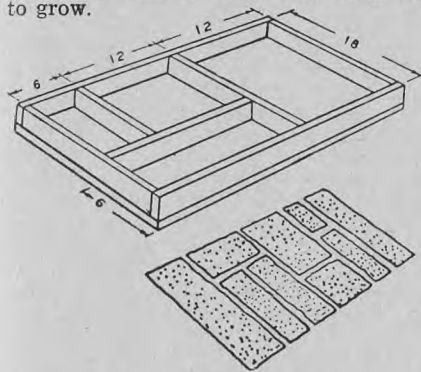
The window shown in fig. 5 is the one commonly used to provide additional ventilation in warm weather, and at the same time avoiding drafts. It swings out at the top in a frame, which can be either of lumber or of galvanized sheet iron so that the inflow of air is over the top.





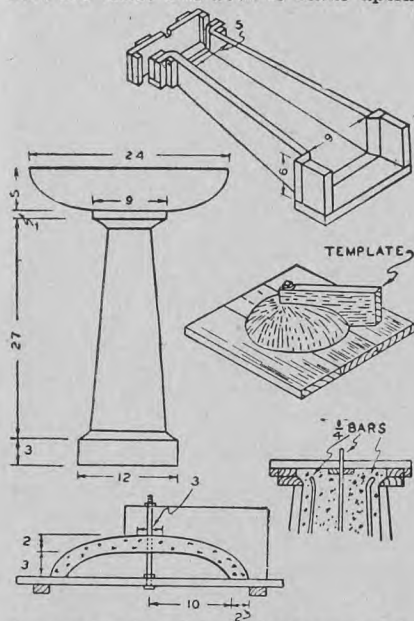
### Making Concrete Walk

The appearance of a concrete walk can be improved at very little expense by making a flagstone effect. This is done by using a form which is so divided that it will make the different sizes of blocks needed. These are then set into a kind of pattern, such as is shown below. The blocks are set in sand just thick enough upon the clay to help get the blocks all to the same level. A pleasing effect is gained if there is distance enough between the blocks for the grass to grow.



### Concrete Bird Bath

The pedestal of this bird-bath is made on the square. It is made in two halves which are then bolted together, the heads and nuts of the bolts being countersunk and the holes covered with concrete. The column is five inches across at the top and nine inches at the bottom. The same form is used in making the two halves. Note that reinforcing rods are used. The bowl is made upside



down using templates. The form for the inside of the bowl is made of clay, shaped as shown in the centre right diagram. On top of this the concrete is worked, as is shown in the lower left. Where there are children it is a good precaution to make the base longer and sink it into the ground so that they cannot pull the bird bath over on themselves.

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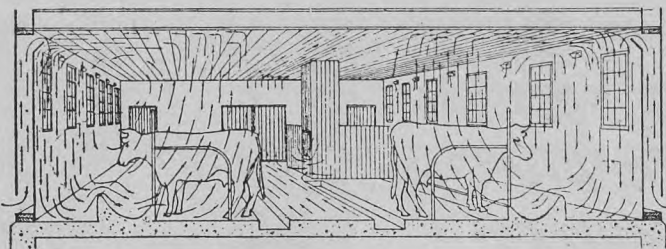


Fig. 1. The movement of air currents in a stable with a King system of ventilation having a single out-take.

Illustrations from Dairy Barn Ventilation, by Prof. L. G. Heimpel.

## Ventilation System for Stable

Two different kinds of ventilating systems have been generally recommended. One is the Rutherford system in



Fig. 2. The framing of the flue above the roof.

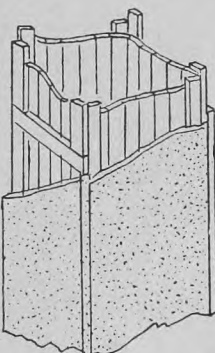


Fig. 3. The construction of the out-take flue.

proof. Then sufficient fresh air can be admitted without lowering the temperature too much.

The chief feature of the modified King system is that there is only one out-take, instead of two or more. Where there is more than one it sometimes occurs that one acts as an intake. One big advantage is that one large out-take is cheaper to build and it can be located at or near the end of the barn out of the way, both in the stable and in the loft. The general movement of air in the stable is shown in fig. 1.

The most important part of the construction of this system is the out-take flue. This is shown in figs. 2, 3 and 4, which are sections of the flue standing in their proper order. The amount of air passing through the stable is governed by the out-take. The higher it is the more rapid the current and so both size and height have to be taken into consideration. For example, a stable containing 15 cows or their equivalent in weight, with a flue 30 feet long from the stable floor to the ridge of the barn would take a flue with a cross section area of 477 square inches or about 22 inches square.

The walls of the flue are insulated. This may be done in several ways. In the illustration the lining is placed upright and is of matched lumber, preferably cheap flooring. It is

nailed in the inside of the frame, which is made of 1x4. The whole is covered on the outside with insulating board, in this case one inch thick. Prof. Heimpel strongly recommends this thickness. Two thicknesses of half-inch insulating board would serve the same purpose.

Fig. 2 shows the framing above the barn roof. The top is sheathed and covered with roofing. Sheet iron flashing is placed around the flue where it projects through the roof. No rainwater must be allowed to enter here as it would injure the insulation. The wind has full sweep through the frame below the top of the flue.

At the stable floor there is a slide, fig. 4, balanced by a weight on a rope and pulley. This slide is right at the floor. It is adjusted by hand, according to the air condition of the stable, which in turn depends on the outside temperature and the velocity and direction of the wind. At the ceiling there is an additional door to be opened when the stable is too hot. The out-take flue is carried straight upward without offsets, well above the ridge of the barn.

The total cross section area of the intake flues should be not less than 75 per cent of the area of the out-take. Each flue should be not more than 50 square inches in cross section area. As most stable studding in this country is six inches the flue should be not more than seven or eight inches wide. No intake should be closer than eight feet to an out-take.

Three designs of intakes are shown in fig. 5. The middle one shows the design used when the installation is made at the time of building. The others may be used for installations in old buildings or with concrete. Note that a flange, on the left hand and the middle designs, keeps the wind from blowing directly into the flue. In each case notice also that the air at the top is deflected toward the ceiling and that a cover is provided to cap the flue so that some of them may be closed when there is a very strong wind blowing, especially in very cold weather.

Prof. J. Macgregor Smith, of the University of Alberta, describes the ventilation of a large pig pen by this system. He made the flues only half the thickness of the walls and placed them against the outside sheathing, leaving a space for additional insulation between the flue and the inside lining.

## Coloring Cement

Coloring concrete, for example the blocks in a patterned walk, is best done by mixing the colors with the dry cement. Different shades may be secured by using different amounts of coloring matter. The method followed is to mix small trial batches until the shade desired is obtained. For blues, use ultramarine blue; for buffs, yellow ochre or oxide; for pinks and reds, small quantities of red oxide of iron. Greens can be obtained by using a mixture of yellow oxide and ultramarine blue

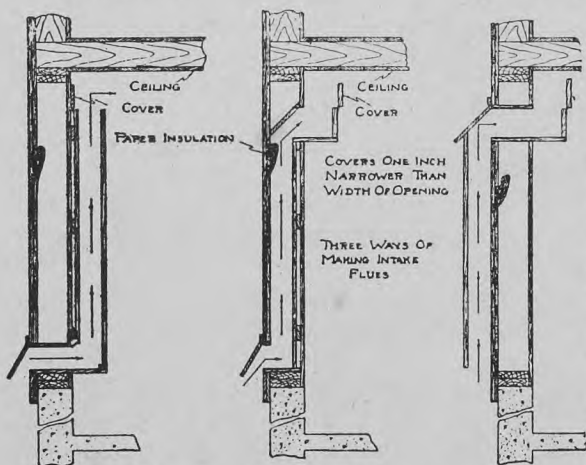


Fig. 5. Different ways of building intake flues.



## How To Use Concrete

In marking out the land for a building the simple use of stakes is often recommended. This method, fig. 1, is an improvement. Small strips of

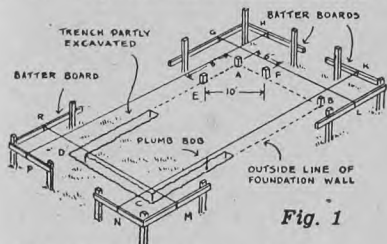


Fig. 1

wood are fastened to the stakes as shown. It is a lot easier to move the string along the strip than to move a stake. In getting the building square there is the good old 6, 8 and 10 rule. Measure 6 feet along one side from the corner, and 8 feet along the other. The diagonal is 10 feet, and if it measures that much exactly the corner will be exactly square.

It may be a long time before they get anything better than concrete for building walks. A thickness of four inches is enough and the width should be 18 inches or more. It is well to have it finished a couple of inches higher than the ground. For drainage a slope to one side of one-quarter to one-half is satisfactory and will scarcely be noticed. Rains will then tend to wash it clean.

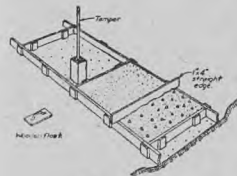


Fig. 2

One course construction, with the finer material worked on top, is the most satisfactory and lasting. Build in 4-foot sections, using 2x4's as sides, and inside the cross piece

place a strip of tar paper. Leave this between the concrete at the intersections. When built in sections the walk is less likely to crack. Finish with a wooden float and after it has set sufficiently to prevent marring, cover with sand or earth for a few days until fully hardened.

Concrete steps neither rot nor burn, and if they are finished with a wooden float the surface will be gritty and therefore non-slip. This set is designed for the back of the house and is very plain. For front steps sides can be worked on. The forms, fig. 3, are of plank and concrete is saved by building a core of stone or earth. Steps should be not more than 7½ inches high with a tread of about 10 inches. When

a walk leads to the steps it should be built first and the steps afterward.

In fig. 4 is shown the cross-section of a concrete floor for the cow stable. The sug-

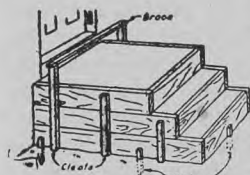


Fig. 3

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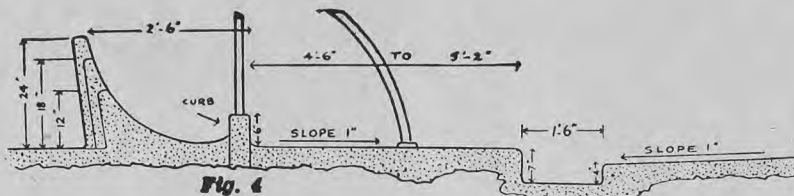


Fig. 4

gested measurements are given and they will be about right. Notice the different ways of building the manger. The gutter is put in at an angle, with the standing platform ranging from 4 feet 6 inches to 5 feet 2 inches in length to accommodate different sizes of animals. When putting in a concrete stable floor it is best to get a booklet from the dealer which gives full instructions for all the operations.

If there is one thing that requires more care than it receives on the average farm it is the well covering. This is on two counts: First, to make it safe for children, and second to prevent surface drainage into the well. Nothing equals concrete for this purpose. Fig. 5 shows the construction in cross section with a manhole and a hole for a pump. The cribbing used in construction is shown. Note that on the outside the concrete is carried down a few inches below the surface of the earth. This provides greater insurance against surface drainage. A neat trick in placing the concrete over the well is to cut the cribbing to fit the top of the well and support it by wires to a framework above. The cribbing can be removed after the concrete has hardened. Old angle iron should be imbedded in the concrete to strengthen it over the well. The edges of the manhole and pump hole are raised slightly to prevent the water from entering.



Fig. 5

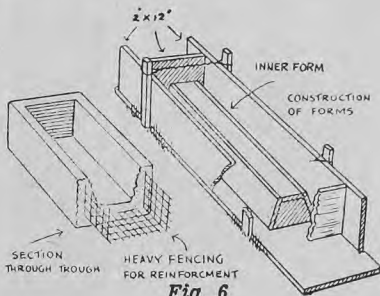


Fig. 6

A well-made concrete hog trough, fig. 6, is cheap, easily kept clean, heavy enough to prevent upsetting easily, and should last a lifetime, barring accidents. Use a stiff mixture of one part cement, two parts sand, and three parts coarse gravel, and use the form and reinforcing as shown. If preferred, a hole of the proper shape can be dug in the ground with the core part enough lower to give the proper thickness.

Fig. 7 shows the construction of an underground concrete tank for any purpose, such as a cistern or a septic

tank. It is now recommended in this western country, for example, that instead of the tile system of disposing sewage an underground tank be used and pumped out when it is full. In building an under-ground structure such as this, forms are used up to where the roof starts to curve. Then a platform is built and on it moist sand is shaped to the inside dimensions of the curved top. The concrete is then applied, and after it has set the sand and inside cribbing can be removed. Cement blocks can be used in a cesspool if there is no danger of contaminating the well, but it is better to be cautious and build it of concrete plastered on the inside with a waterproof coat of equal parts of fine sand and cement.

It is a simple matter to waterproof basement walls and floors. Simply have the walls dry and warm and apply two or more coats of hot asphalt or coal tar or paraffin, roofing cement, asphalt paints, or various patent waterproof coatings. For the floors, lay on top of the earth a ply of roll roofing or heavy waterproofed felt with the joints lapped and cemented, give a coat of hot asphalt, and then lay the concrete floor in the regular way, and there should be no trouble from moisture working up through.

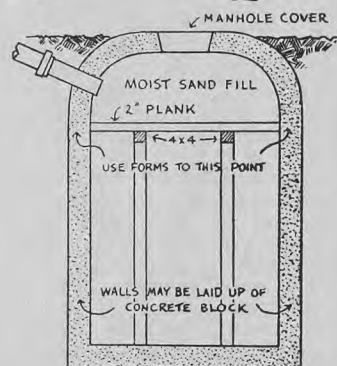


Fig. 7

## Fastening to Concrete Wall

Never use wood when lagging a screw to fasten anything to a brick or concrete wall. Drill the hole a little larger than the screw to be used and fill the hole with leather. Then insert the screw and turn it in tight. Wood rots or powders, but good leather will last indefinitely. This applies when ordinary screw nails are used. For lag screws, which take a larger hole, the leather is cut so that it will line the hole like a piece of hose.



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# Instructions for use of MILLERS FALLS No. 2140 JIG SAW ATTACHMENT For 1/4" CAPACITY ELECTRIC DRILL

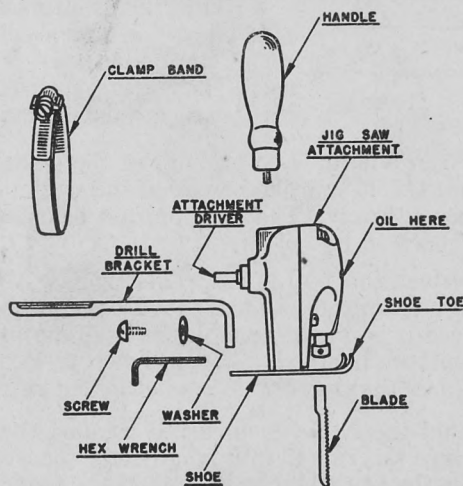


Fig. 1

PLATE NO. 600

This package consists of the Jig Saw Attachment, set of Blades, Hex Wrench, Drill Bracket, Screw, Washer, Clamp Band, and Handle as shown above in Fig. 1.

**Caution:** Do not insert cord plug to electric outlet until your 1/4" Drill and Attachment are completely and securely mounted. Then, before making the connection, make sure that the switch is in OFF position. These precautions will prevent accidental or unintentional starting of the motor. ALWAYS remove cord plug from the electric outlet before disassembling or adjusting the Power Unit or Attachment.

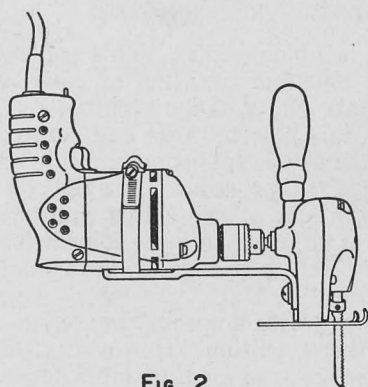


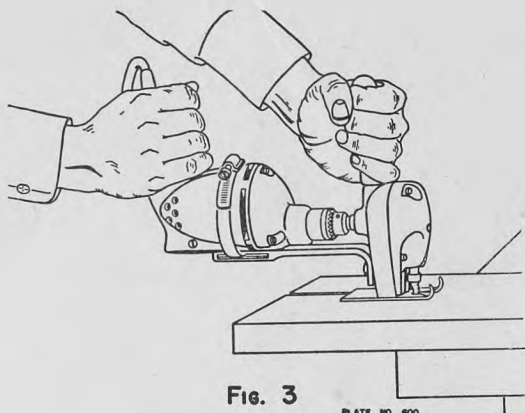
Fig. 2

PLATE NO. 600

**ASSEMBLY INSTRUCTIONS** — Attach Drill Bracket to back of Sawing Attachment by means of the Screw and Washer and tighten lightly. Insert Attachment Driver in Drill Chuck and tighten securely. Place Clamp Band around Drill and through slots in Drill Bracket. Locate Clamp Band so that it does not cover ventilating slots in the Drill and tighten securely. Make sure that the Drill Bracket is in line with the Drill and the Attachment when tightening the Band. Now loosen and retighten securely the Screw which attaches the Bracket to the Saw Attachment. The assembly should appear as shown in Fig. 2.

**NOTE** that the Switch is in the OFF position and insert cord plug in electric outlet. Start motor and note that it does not stop suddenly when switch is released. If it does, the Drill and Jig Saw Attachment are not in alignment. Remove cord from socket and check for misalignment, loosening the Clamp Band and Drill Bracket Screw and retightening both. Insert cord plug and retest. One re-alignment will usually be sufficient. When motor runs freely, the Unit is ready for use.

The most convenient method of holding and guiding the Jig Saw is illustrated in Fig. 3.



To assemble blade, use Hex Wrench provided. Loosen both of the screws in the Blade Holder so that the shank of the blade may be easily inserted. Then tighten one of the screws so that it is lightly pressing against the blade. Then tighten the other screw firmly. This is important as one screw alone will not hold the blade when cutting. Replace the Hex Wrench in its holder.

**SAWING DIRECTIONS** — Do not overload this tool in use. This Jig Saw Attachment will take plenty of abuse, but some Electric Drills designed for intermittent use will not. Do not permit the Unit to “labor” while cutting. You will cut faster if just enough feed is applied to enable the Drill to run at normal speed. This Attachment is primarily intended for sawing contours in wood. It will, however, do very satisfactory cutting in metal with the proper blade if the user realizes that metal just cannot be cut as fast as wood with any kind of tool.

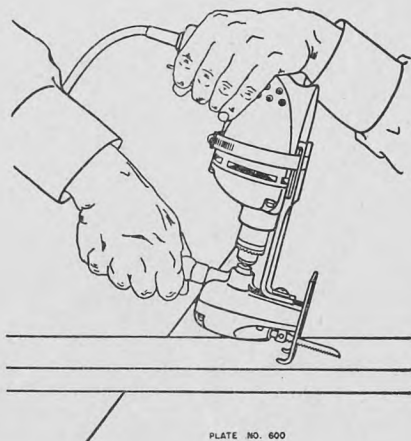
Always use sufficient pressure to hold the Attachment firmly against the material being cut. More Blades are bent or broken by failure to observe this rule than from any other cause. In order to maintain this pressure against the work it is necessary that the work be firmly supported. Avoid overhanging of the board from the bench with no support at the outer end. It is preferable to place two blocks on the bench and saw between them or rest the work on two “horses”.

The directions given above for pressure against the work also apply to metal cutting. Thin metals are best cut by placing between two pieces of  $\frac{1}{4}$ " plywood and clamping firmly together. Draw the design on one sheet of plywood and make the cut. Do not attempt to start on the inside of sheet metal without making a starting hole.

Boards up to  $\frac{7}{8}$ " thick can be sawed at rapid feeds but thicker boards require slower feeds to permit sawdust to clear from the Blade. When small radii are being cut, sufficient time must be allowed for the Blade to clear itself. It is often necessary to make a cut which cannot be started from the outer edge of the board. This can be done easily by drilling a hole just large enough to permit the blade to start. Even this hole cannot be tolerated in some instances.

It will then be necessary to make the starting cut with the Jig Saw Attachment Blade itself. This is readily done with the Millers Falls Saw. Tip the Attachment up on the “toe” of the Shoe (see Fig. 4), start the motor and slowly tip the Unit back so that the point or tip of the Blade touches the work. Do not force the Blade, let it cut its own slot and in short time the Blade will have cut through the Board and you can proceed with your cut in the normal manner. Follow this procedure on a scrap piece of wood to gain experience.

FIG. 4



You will sometimes wish to cut square or oblong holes. This can be done quite easily as follows: Lay out and mark outline of cut-out accurately. Drill a hole in the approximate center of the eventual cut-out. (The larger the better.) Cut from this hole towards any corner, curving the direction of the cut so that the saw is following one side of the outline as it reaches the corner. Repeat this procedure from the hole for each corner. Then insert blade in saw slot at one corner and cut back along line to meet cut already made at adjacent corner. Repeat for each corner. This method applies equally well to triangular, hexagonal or other straight sided holes.

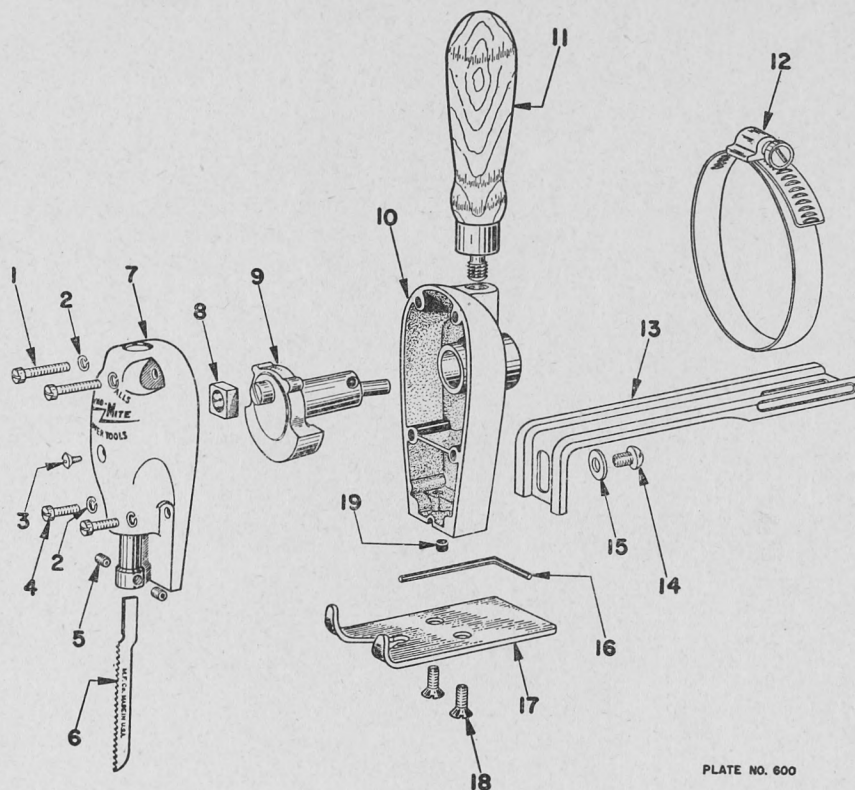
This unit has been lubricated at the factory with a special grease, and under normal use should not require further attention. However, after prolonged heavy use the addition of a few drops of medium oil is desirable. To do this, remove the small screw in front of the unit. Do not over-lubricate.

After a continued period of cutting (with a high-speed drill) the body of the attachment may become fairly warm. This is perfectly normal and need cause no undue concern.

Always remove cord plug from electric outlet before disassembly.



# Parts List for the No. 2140 Jig Saw Attachment



Key No. No. Req.	Pt. No.	Name
1 2	13408	Screw — 8-32 x 7/8 Fil. Hd.
2 4	11537	Lockwasher .....
3 1	100296	Oil Screw .....
4 2	11535	Screw — 8-32 x 1/2 Fil. Hd.
5 2	100262	Set Screw—10-32 x 1/4 Soc.
6 1	100302	“A” Blade 7 Tooth Wood Cutting .....
1 1	100252	“B” Blade 10 Tooth Wood Cutting .....
1 1	100303	“C” Blade 14 Tooth Metal Cutting .....
1 1	100304	“D” Blade 32 Tooth Metal Cutting .....
7 1	40039	Plunger Housing Assm. .... Includes 2 Bearings #18861 1 Welch Plug #12066 1 Yoke #100254 1 Yoke Pin #100260 1 Plunger #100253 1 Air Line #100256

Key No. No. Req.	Pt. No.	Name
8 1	100248	Slide Block .....
9 1	100294	Crankshaft Assm. .... Includes 1 Crankshaft #100265 1 Counter Balance #25592 1 Crank Pin #100251 1 Driver #100292 1 Driver Pin #100293
10 1	40040	Crank Housing Assm. .... Includes 1 Bearing #100249
11 1	25581	Handle .....
12 1	25593	Drill Clamp .....
13 1	31445	Drill Bracket .....
14 1	100266	Bracket Screw .....
15 1	16922	Washer .....
16 1	100263	3/32 Hex Key .....
17 1	25591	Shoe .....
18 2	13641	Screw — 10-32 x 1/2 Flat Hd. ....
19 1	100264	Key Grip .....

**MILLERS FALLS COMPANY**  
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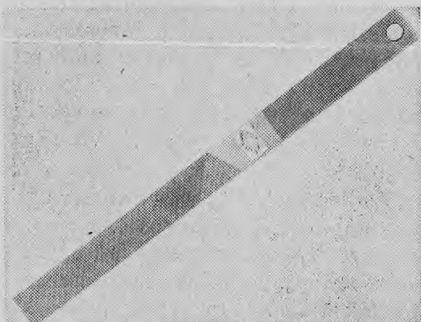
## WHAT'S NEW



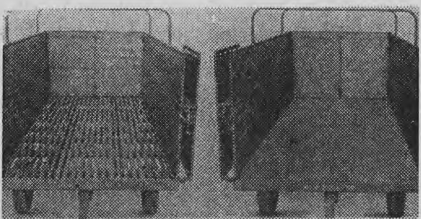
This in-line baler can bale up to ten tons of hay an hour, according to the manufacturers. "In-line" means that the hay travels in a straight line from pickup head to bale chute. Other features are bale-tension twine tie and a leaf-saving hay fold of new design. (Minneapolis - Moline Company) (178) ✓



The "Swathomatic Brodjet" is said to be for field spraying in all wind conditions. It sprays to either side with swaths up to 40 feet in strong side winds, or to both sides with swaths up to 68 feet in normal head or tail winds. It is operated from the tractor seat. (Hanson Equipment Co.) (179) ✓



This rotary lawn mower file can be used to "touch up" the blades while still in the mower, or can sharpen nicked or damaged blades if they are removed from the machine. The manufacturers point out that dull blades shred grass, causing a browned appearance. The file has other uses too. (Nicholson File Co. of Canada) (180) ✓



The illustration shows a dual-purpose crop drying wagon with a slatted floor (l.), which quickly converts to a grain floor (r.), by sliding four perforated metal sections over it. Can be used behind baler, or with a dryer, using airtight canvas cover to seal the heat. (New Holland Machine Company) (181) ✓

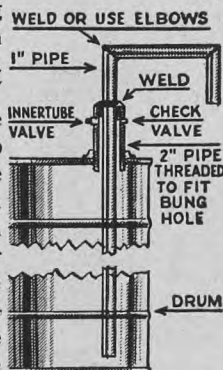
For further information about any item mentioned in this column, write to What's New Department, The Country Guide, 290 Vaughan St., Winnipeg 2, giving the key number shown at the end of each item, as—(17).

## WORKSHOP

Useful Ideas  
For Home and Farm

Here are some methods the handyman can put to use when the need arises

**Emptying a drum.** To empty a drum with air pressure, you first need three lengths of 1" pipe, joined either by welding or using elbows, as shown in the drawing. Then slip a 10" length of 2" pipe over it, into which you have already welded a valve stem from an old truck inner tube. Check valve setting to release about 12 psi. One end of the 2" pipe should be threaded to screw into the bung hole of the drum, and the other end is welded to the 1" pipe. To operate, screw the pipe into the bung hole, connect a tire pump to the inner tube valve, and give a few strokes to supply pressure, which will lift the liquid up the pipe.—S.C., Fla. ✓

**Broom hanger.**

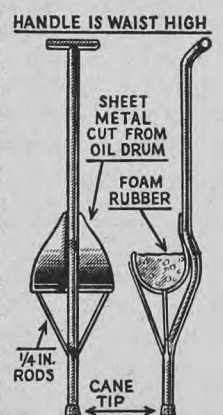
Take a two by six and cut it to 10" length. Make a notch in the center and secure it to the wall wherever it is convenient to hang up a broom, shovel, or other implement of that type.—D.S.M., Man. ✓



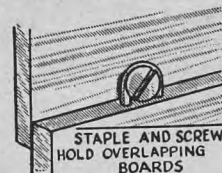
**Sealing water tanks.** If you have a leaking water tank, or steel tub or water trough, paint the inside of it, or use tar on the outside. If one or two coats of tar do not stop the leaking, lay cloth or screening over the bottom of the tank and give it another coat of tar over that. Tar can also be applied inside the tank.—S.S.B., Sask. ✓

**Handy crutch.** I had to get my leg in a cast before I thought of this idea.

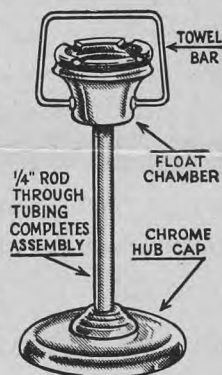
It is to enable you to work in spite of having to balance on a crutch. Bend a suitable length of metal pipe, as shown in the side view, weld a handle at the top of the pipe at about waist height. Cut a piece of sheet metal from an oil drum, and bend it and shape it to fit alongside the pipe, and wide enough to act as a knee rest. Pad this with foam rubber, and weld the rest to the pipe with two 1/4" rods. Add a cane tip to the bottom of the crutch, and you can carry on with your work with both hands free, while keeping your injured foot off the ground.—M.M.E., Alta. ✓



**Screw-staple fastener.** Sometimes you need to fasten two overlapping strips of wood together, and you cannot or don't want to nail them together, and there isn't enough overlap to put a screw through without cracking or weakening one or both of the pieces. Here is a way round the problem. Simply drive a staple into one of the strips, as indicated, leaving an opening large enough for a screw. Then drive the screw in, turning it until the two strips are drawn together firmly. Use as many staples and screws along the strips as may be necessary to hold them together securely.—W.F.S., N.J. ✓



**Smokers' stand.** The materials needed for this are a car hub cap, 18 inches of light tubing, same length of 1/4" rod with nut, a float chamber assembly from a cream separator, a steel towel bar, and a glass ashtray. Run the rod through the hub cap, tubing and float chamber and tighten with the nut beneath the hub cap. Bend the towel bar as a handle and solder it to the float chamber, paint the stand with aluminum paint, with the exception of the chrome hub cap, place the ashtray in position on top of the float chamber, and the smokers' stand is completed at very low cost.—A.E.H., Man. ✓

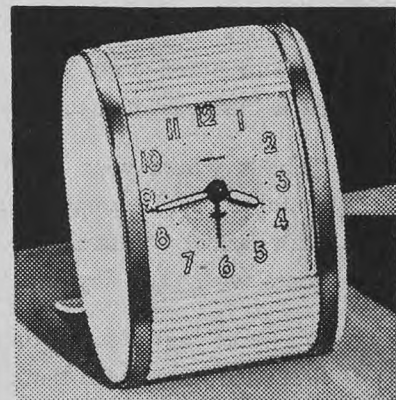


**Nailing metal sheathing.** Most of the difficulty caused by nails pulling loose from metal sheathing can be eliminated by using screw type or ring shank nails, nailed into 2" lumber. Don't nail sheet metal to 1" boards, whatever nails you use. Where metal sheathing is applied over lumber sheathing, keep as many of the joints as possible over rafters or other 2" frame material, and use 2 1/2" nails instead of the usual 1 3/4". These will go through both sheathings and into the 2" rafters.—A.H.S., N.D. ✓

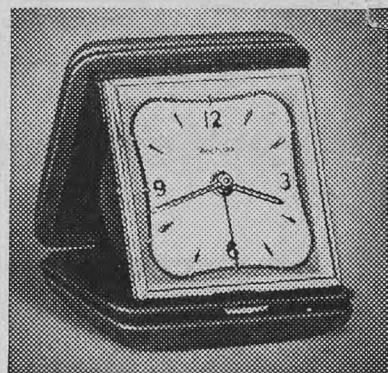
**Heavy rake.** When you need to do some heavy raking, you will find an adapted fork is better than an ordinary garden rake. Simply heat the tines of the fork in a forge and bend them on the anvil. Hammer the tines gently and they will bend easily, but make sure that they are bent evenly.—O.B., Sask. ✓



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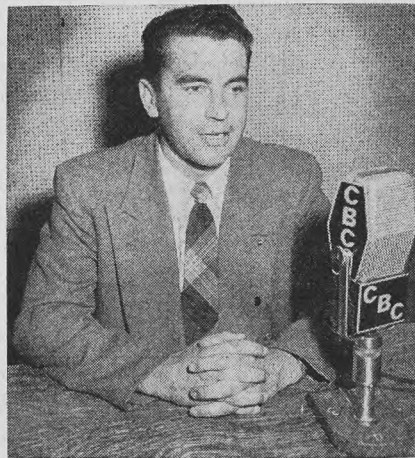
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# Young People

*On the farm and at home*

## Careers In Agriculture



Vern McNair, Winnipeg, chose a career in TV and radio farm broadcasting.

## Farm Broadcasting

(No. 1 in series)

VERN McNAIR of the CBC farm broadcast service, familiar to western radio and TV audiences, is heard daily on farm radio programs from Winnipeg and on the Sunday TV show "Country Calendar." His lively factual commentary, familiarity with his subject and enthusiasm for his work have made Vern one of the most popular commentators in Canadian farm broadcasting.

With an informal manner he puts studio guests at ease while interviewing them and skilfully elicits information he wishes to put across to audiences. We decided "to turn the tables" and interview him.

Vern has first-hand knowledge of farming for he was raised on a farm at Shoal Lake, Manitoba, and continued to work with his father for two years after graduating from high school. In 1947 he entered the University of Manitoba to take the degree course in agriculture. "I chose the general option course," he said, "because I thought it would open a wider range of job possibilities."

After graduation Vern served as agricultural representative for the Manitoba government at Carberry. "This particular district presents a challenge to both farmer and extensionist," he remarked. "In the Carberry area there are many different types of soils, large livestock spreads as well as grain farming and problems of soil drifting and flooding."

He is proud of the growth of 4-H clubs there—from 6 to 27 clubs in four years. Vern attributes this growth to fine local leadership of such men as: Sid Coulthard, Bagot; Ed Chant, MacGregor; Howard Baron, Carberry, and W. Fisher, Welwood. We suggest that the enthusiasm and inspiration of their agricultural representative was also a contributing factor. Carberry also sent a garden club to Toronto in 1955 and

had a winner in the provincial public speaking contest the same year.

Vern joined the CBC farm broadcast department in May 1955 as radio commentator. The following year he started in TV on the "Country Calendar" show. With Lionel Moore, who heads the Winnipeg farm broadcast, Gren Bates and Stan Westaway, he is responsible for presenting farm radio and TV programs for western audiences.

"One of the features of the job which appeals to me is travelling through the country interviewing farmers and making films of good farming practices and equipment which we believe will interest other farmers. And one of our greatest satisfactions is to find some piece of equipment or some procedure we have demonstrated being put into practice on a farm in a different part of the country."

These farm broadcasts also serve to interpret farm problems to city audiences such as the problem of grain delivery. After that show, many phone calls were received by the studio from city people who remarked that they now understood what farmers were up against. "The farm show at present is designed to interest a general audience. As TV is extended and sets increase in rural areas, we are looking forward to programs of more specific interest to farm people," Vern explained.

Radio and TV as well as other agricultural communications such as magazines, newspapers, advertising and exhibiting bring scientific and technical know-how right into farm homes. And these scientific farm practices Vern himself has a chance to put into practice for he now helps manage the home farm at Shoal Lake. V

## Indian 4-H'ers Hold First Sale

ON May 23, the pavilion at the Calgary Exhibition and Stampede grounds was the scene of the first all-Indian 4-H show and sale held in this area. Participating clubs were the Sarcee 4-H Club (Sarcee Indians), the Morley 4-H Club (Stoney Indians), and the Eden Valley 4-H Club (Stoney Indians)—the last named was actually an unscheduled participant, and had no feeding records for their entries, but they managed to collect the award for Grand Champion Calf.

The prize-winning calf was shown by Johnny Left Hand of Eden Valley, and the Reserve Grand Champion was shown by Victor Starlight of the Sarcee club. During the sale which followed, the champion brought 25 cents a pound, and the reserve champion, 22 cents a pound, as compared to the sale average of 20 cents a pound.

Although animal quality could have been better, the event marked an important milestone for these Indian young people who have only been engaged in club work for a short time. V





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Every Electric Tool should be grounded while in use to protect the operator against shock. Proper grounding is a good habit to develop under all circumstances, but is especially important where dampness is present. This unit is equipped with approved 3 conductor cord and 3 blade grounding type attachment plug cap to be used with the proper grounding type receptacle, in accordance with the Canadian Electrical Code. The green colored conductor in the cord is the grounding wire which is connected to the metal frame of the unit inside the housing and to the longest blade of the attachment plug cap.

IF YOUR UNIT REQUIRES LESS THAN 150 VOLTS, IT HAS A PLUG THAT LOOKS LIKE FIGURE "A", it will fit directly into the latest type of 3-wire grounding receptacles. The Unit is then grounded automatically each time it is plugged in.

IF THE UNIT REQUIRES FROM 150 to 250 VOLTS, IT HAS A PLUG LIKE FIGURE "B", and it should be used in the proper standard matching 3-wire grounding receptacle. The unit is then grounded automatically each time it is plugged in.

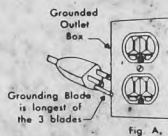


Fig. A.

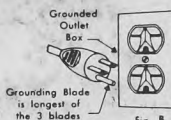
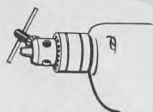


Fig. B

**THE CHUCK:** The geared chuck is a precision instrument, designed for accurate work. Like any good mechanism, it should not be abused. Keep chuck clean and free of rust.



**Operation:** Always bottom the drill bit in the chuck. This permits the chuck jaws to grip the shank fully and prevents cocking the jaws. Use all three holes in the chuck body to tighten as much as possible. Only one hole is needed to to release the bit. Use only a chuck key to tighten or loosen the chuck jaws. If you lose the chuck key, order a new one at once.

To obtain maximum life from the jaw assembly, lock your chuck firmly with the key to prevent drill slippage, when not in use, leave it with the jaws open.

**Removing the Chuck:** Disconnect tool before making any changes. Place the chuck key in the chuck and strike key a sharp blow using a hammer or other object in the same direction that tool normally runs, when loosened unscrew it by hand.



**DRILLING:** Mark exact center of hole with a center-punch or nail to guide the drill bit. Clamp or anchor the work securely. Thin metal should be backed with wood block to prevent bending or distortion. Keep bits sharp and use a lubricant when drilling ferrous metals other than cast iron. Relieve pressure on the tool when bit is about to break through to avoid "stalling" the motor.

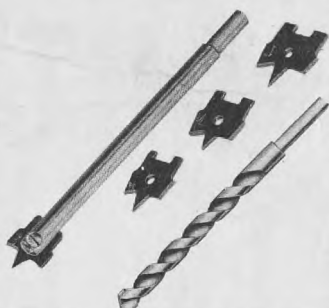
When drilling wood, particularly deep holes, partially remove the bit from the hole several times while in motion. This will clear the chips, speed up drilling and prevent overheating.

In drilling brick, cement, cinder block or similar materials, use carbide tipped Masonry Drill Bits. Ordinary steel bits would be dulled rapidly in this type of work.

**Cat. No. U-1381 Wood Bit Set** includes a Hardened Steel Shank and four of the most popular size bits for boring  $\frac{5}{8}$ ",  $\frac{3}{4}$ ",  $\frac{7}{8}$ " and 1" holes in wood, plywood, masonite, wallboard, plastics, etc.

#### Masonry Drill Bits:

No. U-1550  $\frac{3}{16}$ " Masonry Drill Bit,  $3\frac{1}{4}$ " long,  $\frac{11}{64}$ " shank  
No. U-1551  $\frac{1}{4}$ " Masonry Drill Bit,  $3\frac{1}{2}$ " long,  $\frac{15}{64}$ " shank  
No. U-1552  $\frac{5}{16}$ " Masonry Drill Bit,  $3\frac{3}{4}$ " long,  $\frac{1}{4}$ " shank  
No. U-1553  $\frac{3}{8}$ " Masonry Drill Bit, 4" long,  $\frac{1}{4}$ " shank  
No. U-1554  $\frac{1}{2}$ " Masonry Drill Bit, 6" long,  $\frac{3}{8}$ " shank  
No. U-1555  $\frac{5}{8}$ " Masonry Drill Bit, 6" long,  $\frac{1}{2}$ " shank  
No. U-1556  $\frac{3}{4}$ " Masonry Drill Bit, 6" long,  $\frac{1}{2}$ " shank  
No. U-1557  $\frac{1}{2}$ " Masonry Drill Bit, 4" long,  $\frac{1}{4}$ " shank



## ACCESSORIES & ATTACHMENTS

### SANDING: Sanding Disc Selection

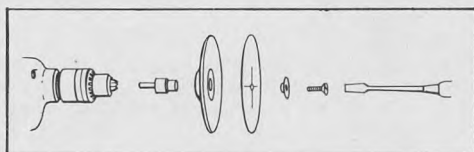
Sanding Discs are available in five different grades as follows:

- No. U-1408 "Extra Coarse"
- No. U-1409 "Coarse"
- No. U-1410 "Medium"
- No. U-1411 "Fine"
- No. U-1412 "Extra Fine"

Coarser grade discs give greater material removal, and finer grades give smoother finishes.

### SANDING DISC ATTACHMENT

In attaching Sanding Discs to pad insert clamp washer and screw thru the sanding disc. Place on pad and thread to arbor. **SECOND:** Place pad arbor in chuck spindle. With the U-1300 Sanding Pad thread directly into spindle of drill.





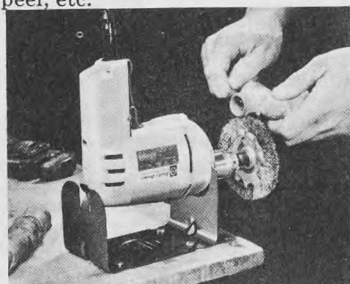
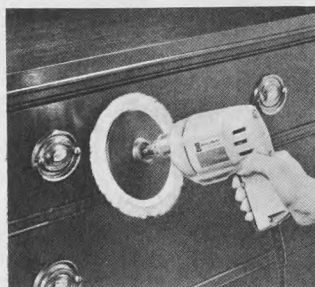
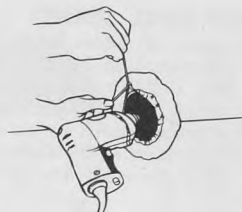
**Polishing:** For polishing operations a Lambswool Bonnet, Cat. No. U-1310, is placed on the Rubber Backing Pad, Cat. No. U-1300.

The Rubber Backing Pad is attached in the same manner as described above. Then place the Bonnet over the Backing Pad and pull the drawstring tight. Tie the drawstring firmly so that the Bonnet does not slip on the Pad. Tuck the loose ends of the drawstring under the inside of the Pad to prevent fouling with the spindle.

The first step in operation is to be sure that the surface to be polished is **CLEAN**. All film of dirt, grit, or other foreign substances should be cleaned from the surface before applying wax. If this cleaning operation is not done the results will definitely be inferior.

Operate the unit freely without forced effort or unnecessary pressure. Tilt the Bonnet slightly for smoothest and most efficient operation. Use a long sweeping motion back and forth advancing along the surface to produce the smoothest finish and highest lustre.

You can also buy from your nearest dealer Black & Decker Pile Fabric Pads which are excellent for use with various compounds for rubbing down painted surfaces, removing orange peel, etc.



### GRINDING WHEEL

May be used for sharpening knives, hand and garden tools, and all types of cutting instruments. Never force objects into Grinding Wheel. Light pressure will prevent burning of surface being ground and also prevent overloading motor.

No. U-1440 3" Med. Grinding Wheel

**WHEEL ARBOR**—for mounting wire wheel brush, grinding wheel or cotton buffing wheel in  $\frac{1}{4}$ " to  $\frac{1}{2}$ " chucks. Has  $\frac{1}{2}$ " dia. body and  $\frac{1}{4}$ " shank.  
Cat. No. U-2206



### COTTON BUFFING WHEEL

Use this with your B&D Tool for countless jobs such as polishing silverware, jewelry, household hardware, metal fittings, Plexiglas and metal toys. When using Cat. No. U-2199 Cotton Buffing Compound with Cotton Buff, apply sparingly.

No. U-1320 3" Cotton Buff

No. U-1321 6" Cotton Buff

**WIRE WHEEL BRUSH:** Ideal for burnishing irregular metal surfaces or removing rust, scale and paint when preparing surfaces for refinishing.

No. U-1200 4" Fine Brush

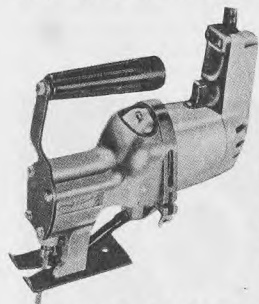
No. U-1201 4" Coarse Brush



**MIXING PAINT:** No. U-1509 PAINT MIXER fits into the chuck of your B&D Drill and enables you to do a thorough paint mixing job quickly and easily. Pour off part of the paint from a full can and lower blade end of Paint Mixer almost to the bottom of the can before turning on. Hold can firmly with one hand while mixing. Before removing turn off motor and allow mixer to stop.

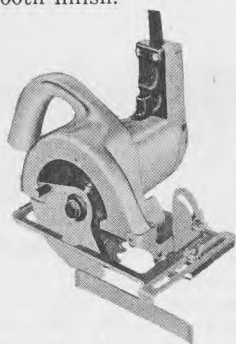


**BENCH DRILL STAND:** Greatly increases the usefulness of your B&D Utility Drill. Base of stand screwed to bench. Mounting your Drill in Cat. No. U-2300 Vertical Drill Stand or U-2302 Horizontal Drill Stand, enables you to do steadier, more accurate drill press work. Feed handle leverage provides extra force for tough drilling jobs and feeds smoothly for delicate work.



**JIG SAW ATTACHMENT:** Cat. No. U-1017 Jig Saw Attachment\* clamps quickly to the housing of your Utility Drill. Easily guided and controlled with one hand, it makes straight, curved or irregular cuts in wood, metal, plastics, leather, etc., with proper B&D blades. Exclusive dust blower utilizes tool's cooling fan to keep cutting line clean and visible. Operation is quiet and the blade's teeth and short stroke make it a safer family power saw.

**FINISH-SANDING ATTACHMENT:** Cat. No. U-1016 Finish-Sanding Attachment\* takes the hard work out of sanding and gives your finishing jobs that "professional" look. Quickly attaches to your B&D power tool and permits sanding at any angle across the grain without fear of scratching or marring the surface. Guarantees an even, satin-smooth finish.



**SAW ATTACHMENT:** Cat. No. U-1013 Saw Attachment\* is one of the most useful and productive Electric Tool Attachments. It locks securely on the tool housing, has all the adjustable features of a professional electric saw and provides efficient power sawing at minimum cost. Gives a cutting depth range from  $1\frac{3}{16}$ " to 0" and bevel cuts from  $90^\circ$  to  $45^\circ$ . Equipped with an adjustable Rip Fence and fast, accurate ripping and a 5" Combination Rip and Crosscut Blade. Neat, closecoupled assembly gives excellent balance and control, and an automatic telescoping blade guard provides for extra-safe operation.

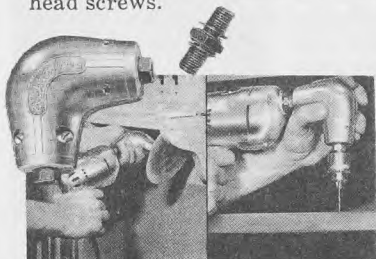
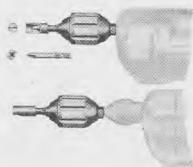
**SCREW DRIVING ATTACHMENT:** Fits  $\frac{1}{4}$ " or  $\frac{3}{8}$ " Utility Drill and drives Slotted Head or Phillips Head screws—far faster and easier than by hand! Attachment threads into spindle or fits any  $\frac{1}{4}$ " to  $\frac{3}{8}$ " chuck. Bit idles until forward pressure of the Drill engages mechanism and drives screw.

No. U-1011 Screw Driving Attachment, complete with U-1370 Bit, listed below.

No. U-1370 Bit for No. 5 to No. 9 slotted head screws.

No. U-1371 Bit for No. 2 point Phillips Head screws.

No. U-1372 Bit and Finder for No. 8 to No. 12 slotted head screws.



**RIGHT ANGLE DRIVE ATTACHMENT:** Cat. No. U-1021 Right Angle Drive Attachment gives your B&D Utility Drill more versatility. Transmits power  $90^\circ$  to the drive line of the tool at double or  $\frac{1}{2}$  the tool's speed. Will drill, sand or polish in hard-to-get-at-places. Makes tough jobs easy! Free to swing  $360^\circ$ , it will operate in any position equally well.

\* Recommended for  $\frac{1}{4}$ " Utility Drills only.



# MAINTENANCE

**LUBRICATION:** This Tool was properly lubricated at the Factory and is ready for use. The gears should be re-lubricated regularly from sixty day to six months, depending on use. Remove gear housing, wipe out all old grease and, with gears in place, refill the housing only half full. The B&D, U-2194 Tube of Lubricant, is ideal for this purpose. The commutator end armature bearing may be lubricated by removing handle cover, exposing the end of the armature shaft. Place one or two drops on shaft and replace handle cover. **DO NOT USE SOLVENTS IN CLEANING GEAR HOUSING.**



**MOTOR:** This tool is equipped with a B&D motor which can be used, at the voltage specified on the nameplate, with Alternating Current at 25, 40, 50 or 60 cycles. Voltage should not vary more than 5%, over or under, the voltage shown of the nameplate or serious overheating and loss of power can result. All motors are tested at the factory and if the tool fails to operate, please take the following action: (1) Check your supply line for blown fuses, (2) See that plug and receptacle are making good contact and (3) Inspect carbon brushes and replace them if they are worn away.

**BRUSHES:** Inspect carbon brushes frequently and replace when badly worn. Cartridge-type brush holders are used to make this operation easy for you. After removing handle cover merely remove both brush caps with a screwdriver and take out the brush and spring assemblies. Springs should have enough tension to hold the brush firmly against the commutator. Be sure to replace badly worn brush assemblies.

Keep brushes clean and sliding freely in their guides. After several brush replacements, the commutator should be inspected for excess wear. If a groove has been cut by the brushes, the tool should be sent to one of our service stations for repair (See back page)

**ELECTRIC TOOL MAINTENANCE KIT CAT. NO. 1460:** Factory replacement parts to assure proper servicing for Black & Decker tools. Contains one tube of lubricant, to replace old gear grease, two brushes, two springs, and two brush caps.



**CABLE:** The cable is the "life line" of the tool—keep it clean by wiping it off occasionally. Keep it out of oils and greases which ruin the rubber. Coil it neatly when not in use and avoid dragging it across sharp surfaces or using it as a handle to lift the tool.

When using the tool at a considerable distance from power source, an extension cable of adequate size must be used to prevent loss of power. Use the table below for 115 volt current.

Extension Cable Length in feet	25	50	75	100	200
A. W. G. gage of cable wire required	18	18	18	18	16
<i>Volts</i>	<i>115</i>	<i>AMPS</i>	<i>MAY 40</i>	<i>14</i>	<i>Tape</i>
	<i>115</i>	<i>2-1</i>			<i>EM</i>

In the event of loss or theft of your B&D Tool—you will find it helpful to have a record of the serial number, etc. Fill out this form and keep it with these instructions in a safe place.

TOOL NAME *B&D*

DATE PURCHASED *31 Dec 64* SERIAL NO. *B-121-3/8*

PLACE OF PURCHASE

### Black & Decker Guarantee

Every Black & Decker product has been carefully inspected before shipment, and we guarantee to correct any defect caused by faulty material or workmanship. Our obligation assumed under this guarantee is limited to the replacing of any part or parts which prove to our satisfaction, upon examination, to have been defective and which have not been misused or carelessly handled. The complete unit must be returned to one of our Factory Service Branches, Authorized Service Stations or to our Factory, transportation charges prepaid. We reserve the right to decline responsibility where repairs or replacements have been made or attempted by others. No other guarantee, written or verbal, is authorized on our products.

Our Guarantee on Black & Decker Products is written to protect your investment and also to protect us against unfair claims. Read it carefully—it says exactly what we will do in case you find it necessary to invoke the guarantee on your purchase.

**TIME** Note that there is no time limit to the operation of this guarantee; by the same token, this is not an unqualified guarantee for any stated period against any and all circumstances. We guarantee our products against "any defect caused by faulty material or workmanship"—regardless of when such defect may occur or become apparent.

**MISUSE** Note that the guarantee is not operative if the product has been misused or carelessly handled. "Misuse" includes, among other things, overloading the product beyond its rated capacity; continuing to use the product after a partial or total failure of some part has become apparent; using it on an application not specified, or using the product in combination with unauthorized attachments.

**UNAUTHORIZED REPAIRS** Many minor adjustments and replacements can be made to our products by an experienced mechanic. Be sure you understand how these adjustments and replacements are to be made before attempting them, or ask our nearest service station for guidance on such points as lubrication, brush replacement, cleaning and similar minor repairs. Do not attempt major repairs unless you are qualified and equipped to complete the repair accurately. Our guarantee is inoperative if "repairs have been attempted by others". Don't risk the loss of your rights under our guarantee by attempting "home-made" repairs. Let our Service Engineers help you; they will inspect the tool and give you any redress to which you are entitled. If the guarantee does not apply—they will, at your direction, put the tool in good operating condition at minimum cost.

### SERVICE PARTS DIAGRAMS

Complete parts diagrams are available for Black & Decker tools. Please fill out the coupon at right

and mail to your nearest Black & Decker Service Branch listed below.



Gentlemen:

Please send me a **FREE** Parts Diagram for the following B & D tool.

Name of Tool.....

Catalog No.....Type.....Model No.....

NAME.....

ADDRESS.....CITY.....PROV.....

### FACTORY SALES AND SERVICE BRANCHES

HALIFAX, N.S.:	803 McLEAN STREET
QUEBEC, P.Q.:	330 ST. ROCH STREET
MONTREAL, QUE.:	7865 ST. LAWRENCE BLVD.
BROCKVILLE, ONT.:	PERTH STREET
REXDALE, TORONTO:	13 RACINE ROAD
SCARBORO, TORONTO:	3559 ST. CLAIR AVE. E.
HAMILTON, ONT.:	180 PARKDALE AVE., N.
WINNIPEG, MAN.:	955 PORTAGE AVENUE
REGINA, SASK.:	1076 ALBERT ST.
EDMONTON, ALTA.:	11440-142ND STREET
CALGARY, ALTA.:	1003-11TH AVENUE
VANCOUVER, B.C.:	167 WEST 2ND AVENUE

Plants at Towson, Md., Hampstead, Md., U.S.A.; Harmondsworth, England; Brockville, Ontario, Can.; and North Croydon, Australia.

BLACK & DECKER, Limited  
Harmondsworth, Middlesex, England.  
BLACK & DECKER (Asia) PTY., Ltd.  
Maroonah Highway, North Croydon,  
Victoria, Australia.

BLACK & DECKER SOUTH AFRICA (PTY.), LTD.  
48 Juta St., Braamfontein,  
Johannesburg, S. Africa.  
BLACK & DECKER (BELGIUM) S.A.  
4, rue d'Aethon, Bruxelles, Belgique.

BLACK & DECKER, S.A.  
Claudio Bernard 780 F, Mexico 7, D.F., Mexico.  
BLACK & DECKER, Inc.  
Rua Oriente, 768, Sao Paulo, Brazil.

# BLACK & DECKER MFG. CO., LTD.

BROCKVILLE, ONTARIO



## Garantie Black & Decker

Chaque outil Black & Decker a été soigneusement inspecté avant l'expédition et nous garantissons de corriger toute imperfection due à une défectuosité du matériel ou de la main-d'oeuvre. La responsabilité que nous assumons en vertu de cette garantie se limite au remplacement de toute pièce (ou pièces) que nos experts jugeront défectueuse, à la condition que l'outil n'ait pas été malmené. L'outil entier doit être retourné affranchi à l'une de nos succursales, à l'un de nos ateliers ou à notre usine. Nous nous réservons le droit de décliner toute responsabilité si des réparations ou des remplacements ont été faits ou tentés par d'autres que nous. Aucune garantie écrite ou verbale autre que celle-ci n'est valable.

Notre garantie des produits Black & Decker protège votre investissement en même temps qu'elle nous protège contre les réclamations injustifiées. Lisez-la attentivement. Elle explique exactement ce que nous ferons si vous jugez nécessaire d'y avoir recours.

**Durée de la garantie:** Veuillez remarquer que cette garantie n'a pas de limite de temps; toutefois, elle ne vaut qu'en des circonstances spécifiques. Nous garantissons nos produits contre "toute imperfection due à une défectuosité du matériel ou de la main-d'oeuvre", quel que soit le moment où cette défectuosité peut survenir.

**Emploi abusif:** Remarquez que la garantie est nulle si l'outil a été l'objet d'abus ou de négligence. Sont englobés dans ce terme d'emploi abusif: la surcharge de l'outil au-delà de sa capacité, son utilisation alors qu'une ou plusieurs de ses pièces sont défectueuses, l'usage qu'on en fait pour un travail pour lequel il n'est pas prévu ou en y ajoutant des accessoires non autorisés.

**Réparations non autorisées:** Beaucoup de petits ajustages et de rechanges peuvent être faits par un homme d'expérience. Assurez-vous de bien comprendre comment ces ajustements et ces rechanges doivent être exécutés avant de les entreprendre. Nos experts se feront un plaisir de vous guider en tout ce qui a trait à la lubrification, au changement des balais, au nettoyage, et aux autres légères réparations. Ne tentez pas de réparations d'envergure si vous n'êtes pas qualifié pour les mener à bien. Notre garantie est nulle si "des remplacements ont été faits ou tentés par d'autres que nous". Ne risquez pas d'annihiler les prérogatives que vous accorde la garantie en effectuant des réparations de fortune. Laissez à nos experts le soin de vous aider; ils examineront votre outil et vous feront bénéficier des droits qui vous sont reconnus par la garantie; si celle-ci ne joue pas, ils remettront votre outil en bon état à peu de frais.

### SCHEMA DE MONTAGE:

Si vous voulez obtenir un schéma de montage des pièces des outils Black & Decker, veuillez remplir le coupon ci-contre et l'envoyer à la succursale de service Black & Decker la plus rapprochée de votre domicile (voir la liste ci-dessous):



Messieurs,

Veuillez m'envoyer gratuitement un schéma de montage des pièces pour l'outil B&D suivant:

Genre d'outil .....

No de cat. .... Type .... No de modèle .....

NOM ..... VILLE ..... PROV. ....

### SUCCURSALES DE VENTE ET D'ENTRETIEN

HALIFAX, N.S.:	803 McLEAN STREET
QUEBEC, P.Q.:	330 ST. ROCH STREET
MONTREAL, QUE.:	7865 ST. LAWRENCE BLVD.
BROCKVILLE, ONT.:	PERTH STREET
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Usines à Towson, Md., Hampstead, Md., U.S.A.; Harmondsworth, England; Brockville, Ontario, Can. et North Croydon, Australia.

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Harmondsworth, Middlesex, England.  
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Victoria, Australia

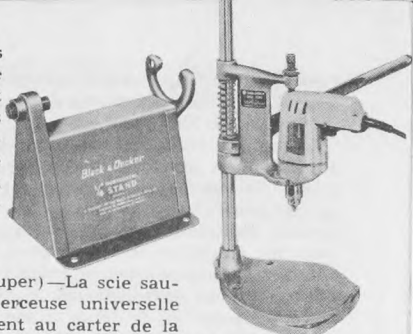
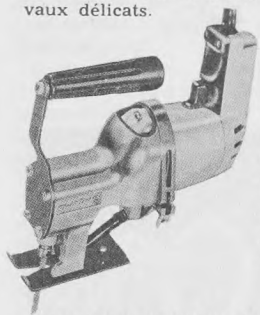
BLACK & DECKER SOUTH AFRICA (PTY.), LTD.  
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BLACK & DECKER, S.A.  
Claudio Bernard 180-F, Mexico 7, DEF., Mexico.  
BLACK & DECKER, Inc.  
Rua Oriente, 768, Sao Paulo, Brazil

# BLACK & DECKER MFG. CO., LTD.

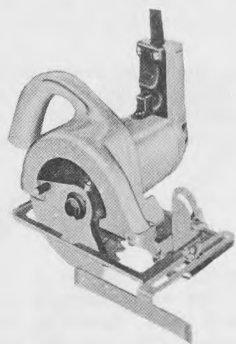
BROCKVILLE, ONTARIO

**SUPPORT POUR PERCEUSE D'ETABI:** Multiplie les emplois de votre perceuse universelle B&D. La base du support se visse sur l'établi. Si vous fixez votre perceuse au support vertical U-2300, ou au support horizontal U-2302, vous travaillerez plus à l'aise, exactement comme avec une perceuse à colonne. Le levier d'avance facilite le perçage des métaux en multipliant la pression de la perceuse et reste quand même d'une extrême précision pour les travaux délicats.



**SCIE SAUTEUSE:** (ou scie à découper)—La scie sauteuse (U-1017 adaptable à la perceuse universelle d'1/4" seulement), se fixe aisément au carter de la perceuse universelle. Facile à guider (une main suffit), elle réussit des coupes droites, courbes ou irrégulières dans le bois, le métal, les plastiques, le cuir, pourvu qu'on emploie les lames B&D appropriées. Le chasse-sciure de modèle exclusif utilise le ventilateur de refroidissement pour garder le trait de scie propre et visible. Fonctionnement silencieux. Ses dents très fines et la faible course de sa lame font de cette scie à moteur la plus sûre pour les travaux de bricolage.

**ACCESSOIRE DE PONÇAGE ET DE FINITION:** L'accessoire de ponçage et de finition U-1016 (adaptable à la perceuse universelle d'1/4" seulement), permet de poncer sans effort et donne un fini d'aspect professionnel. Se fixe rapidement à votre perceuse B&D et permet de poncer à n'importe quel angle du grain sans crainte d'érafler la surface ou de l'abîmer, assure un fini uniforme lisse et satiné.



**SCIE:** La scie U-1013 (adaptable à la perceuse universelle d'1/4" seulement), est l'un des accessoires les plus pratiques de votre perceuse électrique. Elle s'assujettit solidement au carter de l'outil, offre les mêmes possibilités de réglage qu'une scie électrique professionnelle et permet le sciage mécanique à peu de frais. Profondeur de coupe réglable de 0" à 1-3/16"; coupes en biseau de 90° à 45°. Guide réglable rapide et précis pour sciage en long. Lame de 5" combinée pour sciage en long et coupes transversales. Montage serré assurant un équilibre et un contrôle parfaits. Protecteur de lame télescopique automatique assurant un fonctionnement de grande sécurité.

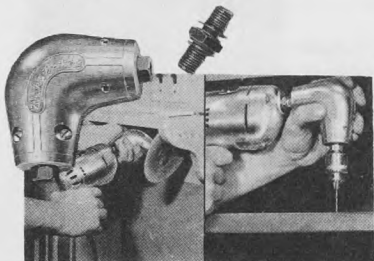
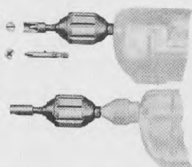
**TOURNEVIS:** Se monte sur n'importe quelle perceuse universelle de 1/4" ou 3/8" et permet d'enfoncer les vis à tête fendue ou à tête Phillips plus vite et plus facilement qu'à la main. L'accessoire se visse dans l'arbre ou s'ajuste à n'importe quel mandrin de 1/4" à 3/8". La lame du tournevis ne tourne pas tant que la pression de la perceuse n'engage pas le mécanisme.

No U-1011 Lame de tournevis, au complet avec tournevis U-1370 cité ci-dessous.

No U-1370 Tournevis pour vis No 5 à No 9 à tête fendue.

No U-1371 Tournevis pour vis No 2 à tête Phillips.

No U-1372 Tournevis et détecteur pour vis No 8 à No 12 à tête fendue.



**TRANSMISSION A ANGLE DROIT:** La transmission à angle droit U-1021 augmente les atouts de votre perceuse universelle B&D. Elle sert d'intermédiaire entre le mandrin et la perceuse et transmet l'énergie à un angle de 90° pour doubler ou couper de moitié la vitesse de rotation de la perceuse. Permet de percer, de poncer, de polir les endroits difficiles d'accès. Facilite le travail. Pivote à 360°. Fonctionne parfaitement dans n'importe quelle position.

Adaptable à la perceuse universelle d'1/4" seulement.



# ENTRETIEN

**LUBRIFICATION:** La perceuse universelle a été convenablement lubrifiée à l'usine et elle est prête à être utilisée. Les engrenages doivent être relubrifiés à intervalles réguliers (au moins tous les soixante jours; jamais plus de six mois), et selon l'usage qu'on en fait. Enlevez le capot des engrenages; essuyez la vieille graisse et, les engrenages étant en place, regarnissez le carter à moitié seulement. Le tube de lubrifiant B&D U-2194 est idéal pour ce graissage. Le coussinet placé au bout du collecteur peut être lubrifié en enlevant le couvercle de la poignée de façon à exposer l'extrémité de l'arbre. Déposez une ou deux gouttes de lubrifiant sur l'arbre et remplacez le couvercle de la poignée.

**N'EMPLOYEZ PAS DE DISSOLVANT POUR NETTOYER LE CARTER DES ENGRENAGES.**

**MOTEUR:** La perceuse universelle possède un moteur B&D qui peut être branché au voltage indiqué sur l'écusson, à un courant alternatif de 25, 40, 50 ou 60 cycles. Ne branchez pas votre perceuse à un courant dont le voltage serait de 5% plus ou moins élevé que celui indiqué sur la plaque d'identification; sinon, il pourrait en résulter des ennuis graves. Tous les moteurs subissent un test à l'usine; si votre perceuse ne fonctionne pas bien, veuillez faire ce qui suit: (1) vérifiez si un fusible n'a pas sauté; (2) voyez si la fiche fait un bon contact électrique dans le socle de la prise de courant, et (3) examinez les balais du collecteur et remplacez-les s'il y a lieu.

**BALAI:** Examinez fréquemment les balais et remplacez-les s'ils sont très usés. Pour vous faciliter la tâche, employez des porte-balais type à cartouche. Après avoir enlevé le couvercle de la poignée, extrayez les deux capuchons des balais avec un tournevis et retirez la cartouche. Les ressorts doivent être assez tendus pour appliquer les balais fermement contre le collecteur.

Gardez les balais propres et coulissants dans leurs guides. Après avoir remplacé les balais plusieurs fois, il faut vérifier si le collecteur n'est pas trop usé. Si les balais y ont creusé une rainure, il faut envoyer l'outil à un de nos ateliers de réparations (adresses plus loin).

## LE NECESSAIRE D'ENTRETIEN POUR OUTILS ELECTRIQUES

**NO DE CAT. 1460:** Pièces de rechange de l'usine assurant un service d'entretien approprié pour les outils Black & Decker. Contient un tube de lubrifiant pour remplacer la vieille graisse des engrenages, deux balais, deux ressorts, et deux capuchons de balais.



**CABLE:** C'est par le câble que l'outil est actionné. Gardez-le donc bien propre en l'essuyant de temps à autre. Evitez qu'il entre en contact avec des huiles et des graisses qui peuvent détériorer le caoutchouc. Enroulez-le quand vous ne vous servez pas de l'outil. Evitez de traîner ou de soulever l'outil par le câble.

Quand vous employez la perceuse à une distance considérable de la source de courant, employez un câble de rallonge de grosseur appropriée afin de prévenir toute perte de puissance. Employez le tableau ci-dessous pour le courant de 115 volts.

Longueur en pieds du câble de rallonge	25	50	75	100	200
Jauge A.W.G. du fil requis	18	18	18	18	16

En cas de perte ou de vol de votre outil B&D, il est bon que vous sachiez le numéro de série de votre outil et les quelques détails qui suivent. Remplissez cette formule et gardez-la en lieu sûr.

GENRE D'OUTIL .....

DATE D'ACHAT ..... No DE SERIE .....

ACHETE CHEZ .....

**LE MANDRIN:** Le mandrin à engrenage est un instrument de précision conçu pour travailler avec précision. Comme tout bon mécanisme, il ne doit pas être soumis à un usage abusif. Gardez le mandrin bien propre et exempt de rouille.



**Fonctionnement:** Enfoncez toujours les forets et mèches à fond dans le mandrin. Cela permet de bien serrer la tige de la mèche entre les mâchoires du mandrin et prévient la déformation des mâchoires. Employez les trois trous dans le corps du mandrin pour serrer aussi à fond que possible. On peut libérer la mèche par un seul trou. N'employez que la clef du mandrin pour serrer ou desserrer les mâchoires. Si vous perdez cette clef, commandez-en une autre immédiatement.

Pour obtenir une durée prolongée des mâchoires, serrez fermement le mandrin avec la clef et évitez que la mèche glisse. Quand vous ne vous servez pas de l'outil, laissez les mâchoires du mandrin ouvertes.

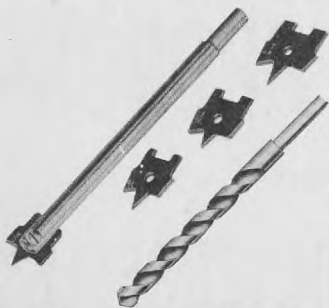
**Pour enlever le mandrin:** Débranchez l'outil avant de faire quelque changement que ce soit. Placez la clef dans le trou du mandrin et donnez un coup sec sur celle-ci avec une pièce de bois, dans la direction de rotation normale de l'outil. Une fois le mandrin desserré, dévissez-le à la main.



**PERÇAGE:** Marquez exactement le centre du trou avec un pointeau ou un clou pour guider la pointe de la mèche. Serrez ou fixez solidement la pièce à percer. Quand on perce du métal mince, il faut le placer sur un bloc de bois pour éviter qu'il se déforme. Gardez les mèches bien affûtées et employez un lubrifiant quand vous percez des métaux ferreux autre que la fonte. Afin d'éviter de "caler" le moteur, réduisez la pression sur l'outil au moment où la mèche va sortir à l'autre extrémité du trou.

Quand vous percez du bois, surtout si vous faites des trous profonds, retirez partiellement la mèche hors du trou plusieurs fois au cours du perçage. Cela libérera la "sciure", accélérera le perçage et préviendra la surchauffe.

Quand vous percez de la brique, du ciment, des blocs de béton ou des matériaux semblables, employez des forets à maçonnerie à plaquettes de carbure. Des forets en acier ordinaire s'émousseraient rapidement.



**No U-1381—Jeu de mèches à bois.** Comprend une tige en acier trempé et quatre des mèches les plus employées pour percer des trous de 5/8", 3/4", 7/8" et 1" dans le bois, le contreplaqué, la masonite, la planche murale, les plastiques, etc.

#### Forets à maçonnerie:

No U-1550 Foret à maçonnerie de 3/16" longueur 4", tige 11/64"  
No U-1551 Foret à maçonnerie de 1/4", longueur 3 1/2", tige 15/64"  
No U-1552 Foret à maçonnerie de 5/16" longueur 3 3/4", tige 1/4"  
No U-1553 Foret à maçonnerie de 3/8", longueur 4", tige 1/4"  
No U-1554 Foret à maçonnerie de 1/2", longueur 6", tige 3/8"  
No U-1555 Foret à maçonnerie de 5/8", longueur 6", tige 1/2"  
No U-1556 Foret à maçonnerie de 3/4", longueur 6", tige 1/2"  
No U-1557 Foret à maçonnerie de 1/2", longueur 4", tige 1/4"

## ACCESSOIRES

### PONÇAGE: Sélection des disques de ponçage.

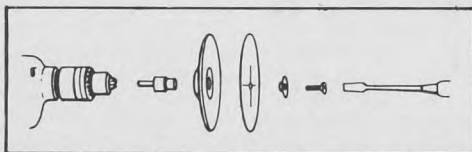
Les disques de ponçage sont disponibles en cinq grains différents, comme suit:

No U-1408 "Très gros"	No 20
No U-1409 "Gros"	No 36
No U-1410 "Moyen"	No 50
No U-1411 "Fin"	No 80
No U-1412 "Très fin"	No 120

Les disques à gros grain enlèvent plus de matière; les disques à grain fin donnent des finis plus doux.

### DISQUES DE PONÇAGE

Pour fixer les disques de ponçage sur le plateau de caoutchouc, insérez la vis de fixation à travers la rondelle de métal, le disque et le plateau; puis, vissez le tout sur le mandrin spécial. **ENSUITE,** placez la tige de ce mandrin entre les mâchoires du mandrin de la perceuse. Si vous employez le plateau de ponçage U-1300, vissez le mandrin spécial directement à l'arbre de la perceuse après que le mandrin à engrenage a été enlevé.





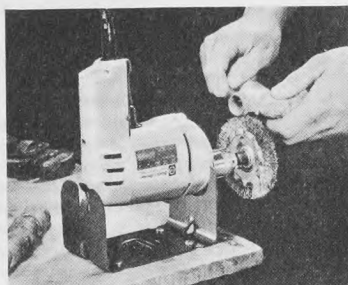
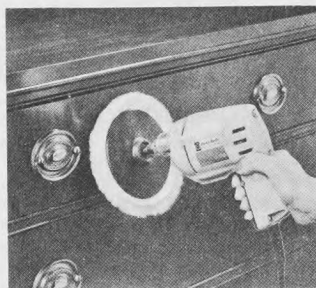
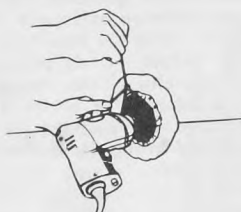
**Polissage:** Pour les opérations de polissage, placez un bonnet de laine d'agneau No de cat. U-1310 sur le plateau de caoutchouc No U-1300 ou U-1302.

Le plateau de caoutchouc se fixe de la même façon que le disque de ponçage. Placez ensuite le bonnet sur le plateau de caoutchouc et tirez les cordons à fond. Attachez-les solidement afin que le bonnet ne glisse pas sur le plateau. Rentez les extrémités des cordons sous le plateau pour les empêcher de s'entortiller sur l'axe.

Avant de commencer le travail, assurez-vous que la surface à polir soit **PROPRE**. Il faut la débarrasser de toute poussière et de toute saleté avant d'appliquer la cire, sinon les résultats obtenus ne seront pas satisfaisants.

Laissez glisser sans trop de pression le bonnet de polissage sur cette surface cirée. Inclinez légèrement l'outil pour que le périmètre du plateau soit seul en contact avec la surface. Pour obtenir un fini lisse et lustré, travaillez en un long mouvement de va-et-vient, en avançant à chaque course.

Vous pouvez aussi acheter chez votre marchand les tampons de peluche Black & Decker, particulièrement destinés au polissage des surfaces peintes et qu'on emploie avec de la poudre de ponce.



**MEULE A AFFÛTER:** Peut être employée pour aiguiser les couteaux, les outils à main et les outils de jardin, ainsi que toutes sortes d'instruments de coupe.

Ne pressez pas trop les objets à affûter contre la meule. Une pression trop forte risque de brûler l'outil qu'on affûte ou de surcharger le moteur.

No U-1440 Meule à affûter de 3", grain moyen.



**ARBRE PORTE-ROUE:** pour monter une roue à brosse métallique, une meule à affûter ou une roue de polissage à tampon de coton dans des mandrins de 1/4" à 1 1/2". Corps de 1/2" de diam. et tige de 1/4". No de cat. U-2206

**MEULE EN TOILE:** Employez cet accessoire avec votre perceuse universelle B&D pour mener à bien d'innombrables petits travaux: polir l'argenterie, la bijouterie, les articles de quincaillerie, les accessoires métalliques, les jouets de Plexiglas et de métal, etc. . . . Appliquez un peu de poudre de ponce U-2199 sur le tampon à polir.

No U-1320 Tampon à polir de 3"  
No U-1321 Tampon à polir de 6"

**ROUE A BROSSSE METALLIQUE:** Parfaite pour polir les surfaces métalliques irrégulières ou pour enlever la rouille et la peinture qui s'écaille quand on prépare des surfaces à repeindre.

No U-1200 Brosse fine de 4"  
No U-1201 Brosse grossière de 4"

**MELANGEUR DE PEINTURE:** L'accessoire U-1509 s'adapte au mandrin de votre perceuse B&D et mélange la peinture à fond rapidement et facilement. Ne mélangez pas la peinture à même le bidon complètement rempli: enlevez-en à peu près le tiers. Plongez-y l'agitateur presque au fond avant de le mettre en marche. Tenez fermement le bidon pendant l'opération. Coupez le moteur avant de retirer l'agitateur et laissez ce dernier s'arrêter complètement.





# Black & Decker

## LE PLUS IMPORTANT FABRICANT D'OUTILS MÉCANIQUES AU MONDE



ce qu'il importe de

# SAVOIR A PROPOS

de votre . . .

## PERCEUSE UNIVERSELLE

### ★ MISE À LA TERRE ★

Tout outil électrique devrait être mis à la terre, pendant son emploi, pour protéger l'opérateur contre les risques de chocs électriques. Il est bon d'avoir une prise de terre appropriée à n'importe quelle circonstance, mais ceci est particulièrement important en cas d'humidité. La perceuse B & D est munie d'un cordon approuvé à 3 fils et d'une fiche à 3 lames pour mise à la terre, qui doit être utilisée avec la prise appropriée pour mise à la terre, conformément au Code électrique canadien. Le conducteur vert dans le cordon est le fil de mise à la terre qui est relié au bâti métallique de la perceuse, à l'intérieur du carter, et à la lame la plus longue de la fiche.

SI VOTRE UNITÉ DEMANDE MOINS DE 150 VOLTS, LA FICHE RESSEMBLE À CELLE DE LA FIGURE "A", et pourra être branchée directement sur le type le plus récent de prises à 3 fils pour mise à la terre. L'unité est alors automatiquement mise à la terre chaque fois qu'elle est branchée.

SI LA PERCEUSE DEMANDE DE 150 à 250 VOLTS, LA FICHE RESSEMBLE À CELLE DE LA FIGURE "B", et elle devra être branchée sur une prise standard appropriée à 3 fils pour mise à la terre. La perceuse est alors automatiquement mise à la terre chaque fois qu'elle est branchée.

